

PORTLAND FIRE WEATHER – 2008 ANNUAL REPORT

2008 FIRE SEASON OVERVIEW

The 2008 fire season for Northwest Oregon and Southwest Washington was typical of most past seasons. The peak part of the season started a little later than usual due to substantial mid and high elevation snow pack and a cool and moist early June. The main part of the fire season started around the second week of July and continued through mid-August. A couple of wetting rain events during the second and third week of August resulted in a short-lived lull in the fire season, but a very warm and dry September allowed a return to extreme fuel conditions. Peak Energy Release Component (ERC) values exceeded the 97th percentile in most inland areas as late as the third week of September.

Six Red Flag events occurred during the season, which is about twice the yearly average. The first Red Flag event occurred July 12th. The final Red Flag event happened September 28th. September conditions were slightly more extreme than the typical late-July through August period. Fortunately, there were no lightning days in September. A total of 28 warnings were issued, slightly less than the 32 of last year. However, there were eight missed warnings, compared to zero the previous year. There were four large fires in the forecast area. One fire, the Gnarl Ridge Fire, started on August 8th, and was seemingly contained by late-August. However, the fire erupted again in mid-September during a Haines 6 or dry and unstable air mass. The fire was turned back to the local unit on October 2nd, but was not declared contained. The last official report for the fire was October 15th.

The pre-season precipitation was generally below average at lower elevations, such as the coast and inland valleys, but above average in the Cascades and foothills. Substantial mountain snow fall occurred from mid-December through mid-January. Extreme snow fall conditions from late-January through mid-February created incredible snow depths in the mid and high elevations of the Cascades. At Detroit, located in the North Oregon Cascade foothills east of Salem, the snow depth reached around five feet. Snow depth at Government Camp reached 140 inches on February 8th. This was nearly twice the maximum depth recorded in 2007. Another cold and wet period in late-March through early April brought more snow to the Cascades and foothills. Government Camp snow depth was near 100 inches as late as April 25th.

Springtime precipitation was above normal in April, but below to well-below normal in May. A late-spring cool and moist period brought ERC values to near zero as late as June 10th, similar to 2007. An abrupt shift to warm and dry conditions started in mid-June. Fuel conditions reached critical levels in mid-July and remained that way through mid-August. The seasonal dry spell was two to three weeks longer than that of 2007. The longest dry spell of 68 days occurred in the Coast Range. A shift to a late-fall pattern at the end of September and early October brought a sudden halt to the fire season.

Fuel conditions were more extreme in 2008 as compared to last year. In 2007, the South Washington and North Oregon Cascade zones experienced a day with an average ERC greater than 45, while during 2008 there were four days. The 97th percentile ERC value of 46.6 was achieved on September 16th. ERC values in the Central Oregon Cascades

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and foothills reached or exceeded the 97th percentile of 50 on four days in 2007 as compared to 11 days in 2008. The highest daily average was 56.9 on September 16th, a value which represents record levels. Emigrant RAWS reported an ERC of 78 on September 16th. The most time period of the fire season for the past three years has occurred in the first half of September. However, in 2008, critical conditions extended into the last week of September. The human-caused Kitson Springs Fire, on the Willamette NF, started on September 24th, making its biggest runs on the 27th and 28th during a Red Flag Haines 6 event.

Similar to last year, the early part of fall, late September and early October, was quite wet. ERC values went from extreme values around September 21st to less than 20 by October 10th. In 2006 ERC values remained at or above the 75th percentile through October 10th.

The 2008 season came to an abrupt end by the second week of October as a series of wet storm systems impacted the district. Several RAWS in the Cascades and foothills received an inch or more of precipitation on October 3rd and 4th. The wet regime continued through much of October. Government Camp reported a snow depth of nine inches on October 21st and snow remained on the ground through the 23rd.

There were six critical fire weather events in 2008. One event was for problematic lightning, and another was for wind and low humidity. The remaining four events were for dry and unstable air mass patterns with Haines 6 indices. One missed lightning event occurred on August 16th.

Most of the district experienced below-normal lightning activity in 2008. Lightning days were interspersed throughout the season, although most areas showed a slightly higher frequency in mid-August. The Central Oregon Cascade zones typically experience 18-20 lightning days per season, but in 2008, this area had only 10 lightning days. Half of the 10 days took place during the first three weeks of August. It is interesting to note that the Coast Range zones, 602 and 603, had eight lightning days, nearly as many as the Cascade zones.

Red-Flag criteria remained unchanged for the 2008 season. The concept of problematic lightning devised by the Northwest Coordination Center continues to be used. Its main premise is to develop Red-Flag criteria highly dependent on current and forecast fuel conditions before, during, and after a significant weather event. The idea is to move away from the subjectivity inherent in the dry lightning concept, or the idea of using specific rainfall criteria. The new criteria provide a better means of verification. More attention has been directed at Haines 6 patterns, specifically, surface thermal trough passages. In the past several years, surface thermal trough passages have been responsible for extreme fire behavior resulting in significant fire growth on existing fires. Dry and unstable conditions brought the Gnarl Ridge Fire back to life in mid-September, after about four weeks of inactivity. The Cold Springs fire exhibited significant nocturnal fire growth due to the presence of a surface thermal trough and associated subsidence inversions. Finally, Haines 6-type conditions led to the major growth exhibited on the Kitson Springs Fire in late September.

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A major fire is defined as 100 acres or an incident that requires at least a Type II management team. The forecast district experienced four large fires in 2008. In 2007 there was one large fire, and in 2006 there were three large fires. Two of the large fires occurred on the Willamette NF. The Mt. Hood NF was the location for one large fire, and the Gifford Pinchot NF had the other fire. The 7000-acre plus fire on the Gifford Pinchot, called the Cold Spring Fire, was one of the largest fires to burn on the forest in decades. Three of the large fires were lightning-caused, and the Kitson Springs fire was caused by humans.

It was another active year for the Portland Incident Meteorologists (IMETS). The IMETS provided service on seven incidents, and eight fires. IMET service was provided on wildfires in North-Central California, Northwest California, and Southwest Oregon.

Spot forecast activity showed a substantial increase this year as compared to 2007. The most significant increase was in wildfire spot forecast service. In 2007 there were 25 wildfire spot forecast requests. During the 2008 season there were 73 wildfire spot requests. The 2008 spot-total of 134 was 41 percent higher than 2007. The Willamette NF continues to show the highest frequency of spot requests. There were 50 spot requests from the Willamette NF, down slightly from the 58 in 2007. The Oregon Department of Forestry (ODF) has become more involved in the spot forecast service provided by the National Weather Service. Last year, ODF had 14 spot forecast requests, 8 of which were for wildfires. This year, ODF submitted 24 requests, but 13 were for prescribed burn projects. The Fish and Wildlife Service got involved in the spot program during the 2008 season, issuing nine requests, nearly all of which were for prescribed burn projects near the Finley Wildlife Refuge.

Training and outreach remain a significant part of the fire weather program at the Portland office. The staff taught numerous classes, beginning as early as mid-December 2007. Teaching requests continued into June. The Portland office continues to provide assistance to some of its former east-side users as well.



FIGURE 1 – PORTLAND FIRE WEATHER DISTRICT

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2008 PRE-SEASON: PRECIPITATION

Table one (below) shows precipitation amounts for various locations from fall through spring. It is interesting to note that the coast and inland valley sites were slightly below normal to well below normal. The Cascade foothill and Cascade sites had above normal precipitation. The overall seasonal averages for the coast and Willamette Valley ranged from 10 to 20 percent less than 2007. November was dry, with nearly all sites receiving 50 to 70 percent of normal precipitation. December and January had normal to slightly above normal precipitation, with well above normal snowfall in the foothills and Cascades, as well as the Coast Range. Snow-water equivalent values were well above normal in February and March as well. In March the Willamette Basin received almost 200 percent of normal snow-water equivalent. Many foothill areas between 1500 and 2500 feet MSL experienced record-setting snow fall. In one instance, a state of emergency was declared in Detroit, about 1500 feet MSL in the North Cascade foothills, due to extreme snow fall. The North Coast Range Basin had 442 percent of normal snow water equivalent in March. Typically, the Coast Range does not have much of a snow pack in March. The first part of May was warm and dry, but turned cool and wet during the last two weeks. Overall, most areas picked up 35 to 55 percent of normal precipitation in May. The exception was the North Oregon Cascades and foothills, where precipitation was slightly above normal.

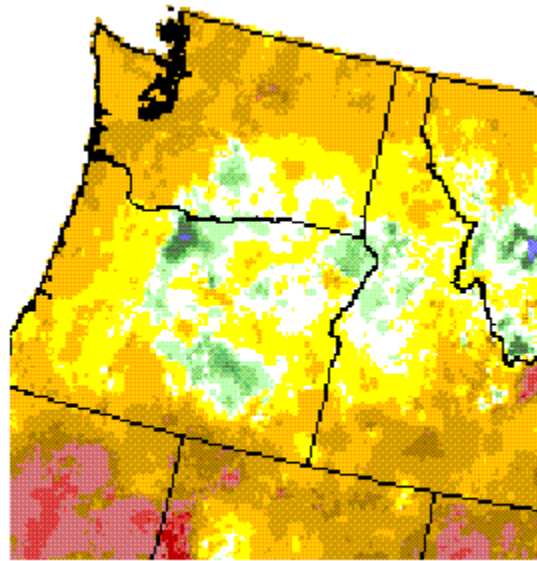
The abundant mid and high-elevation snow pack limited spring burning projects and gave rise to the premise that peak fire season would start later than normal. June started off wet, resulting in an additional lag to the onset of fire season, but by mid-July fuel indices in the Cascade zones had reached the 90th percentile. The Cold Springs Fire, in the Gifford Pinchot NF, started on July 12th. The 7000-plus acre fire was one of largest wildfires the forest had ever experienced. As has been the case for the past couple of years, peak fire season received a respite in mid to late August due to wetting rain events. The dry spell, defined as the number of consecutive days with median precipitation of one-tenth of an inch or less for an area, would have exceeded 90 days in the Cascades if the wetting rain events in mid-August had not occurred.

TABLE 1 - 2007-2008 WET SEASON PRECIPITATION SUMMARY

	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOT	AVE	PCT AVE
Astoria	5.07	11.57	9.24	5.49	8.79	5.12	2.09	47.37	53.71	88.20%
Newport	6.32	12.97	11.09	3.76	7.37	5.81	0.99	48.31	57.47	84.06%
Fall Creek	9.26	21.18	19.68	8.58	10.98	9.55	1.16	80.39	78.34	102.62%
Portland	4.25	7.57	4.71	2.19	3.71	2.09	2.03	26.55	28.98	91.61%
Eugene	4.46	7.08	8.31	1.65	4.49	1.63	0.55	28.17	42.35	66.52%
G. Camp	12.31	17.43	15.43	13.74	12.50	9.32	6.71	87.44	71.40	122.46%
Oakridge	4.90	9.32	9.06	3.16	6.08	3.66	2.35	38.53	37.34	103.19%

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Figure two depicts the November 2007 precipitation anomaly for the Pacific Northwest. The charts on pages 6 through 9 show 2007-2008 pre-fire season precipitation at selected sites compared to normal.



NOV. 2007 PRECIPITATION ANOMALY

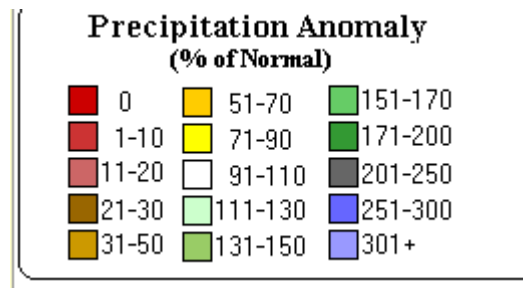


FIGURE 2 – NOVEMBER 2007 PRECIPITATION ANOMALY (COURTESY OF OREGON CLIMATE SERVICE)

The coast experienced a major precipitation deficit in May 2008. Below are coastal precipitation amounts for May and the percentage of average:

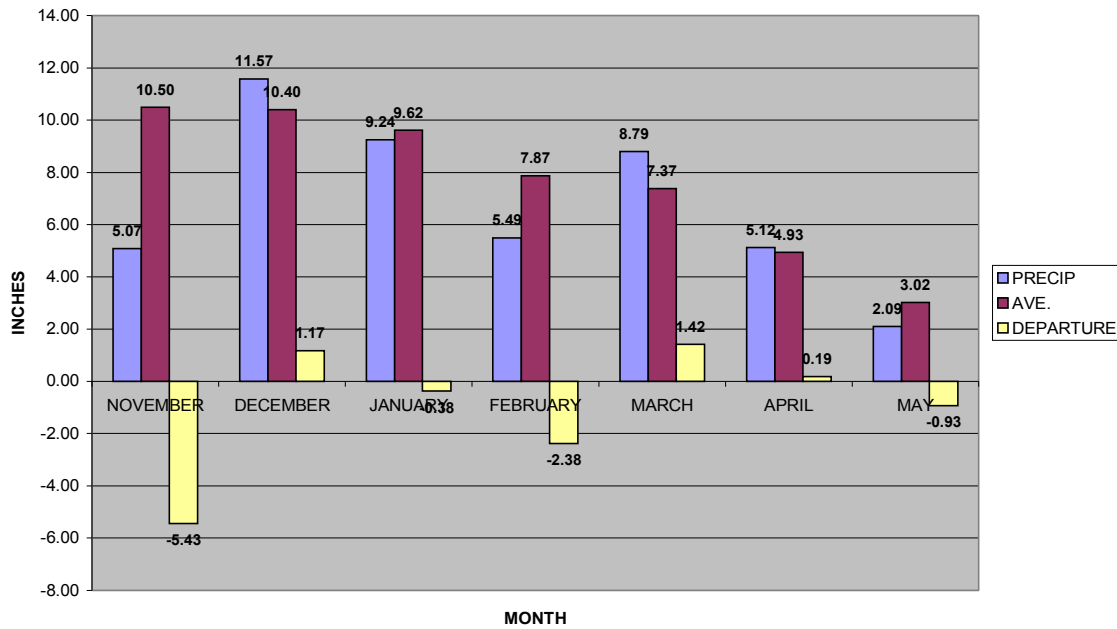
<i>GOLD BEACH R.D.</i>	<i>0.56</i>	<i>14.5%</i>
<i>SEASIDE</i>	<i>1.89</i>	<i>47.7%</i>
<i>TILLAMOOK</i>	<i>2.08</i>	<i>43.0%</i>
<i>ASTORIA</i>	<i>2.09</i>	<i>63.7%</i>
<i>NORTH BEND</i>	<i>0.51</i>	<i>15.0%</i>

Other west side stations with well-below normal May precipitation include:

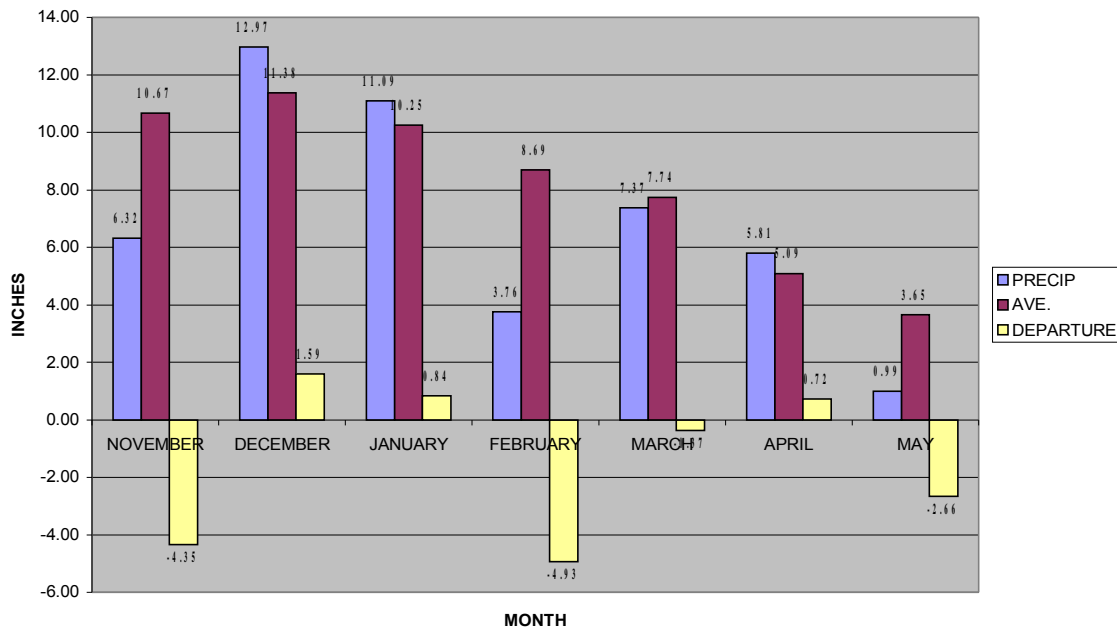
<i>CORVALLIS OSU</i>	<i>0.38</i>	<i>16.5%</i>
<i>DRAIN</i>	<i>0.66</i>	<i>26.2%</i>

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2007-2008 WET SEASON ASTORIA

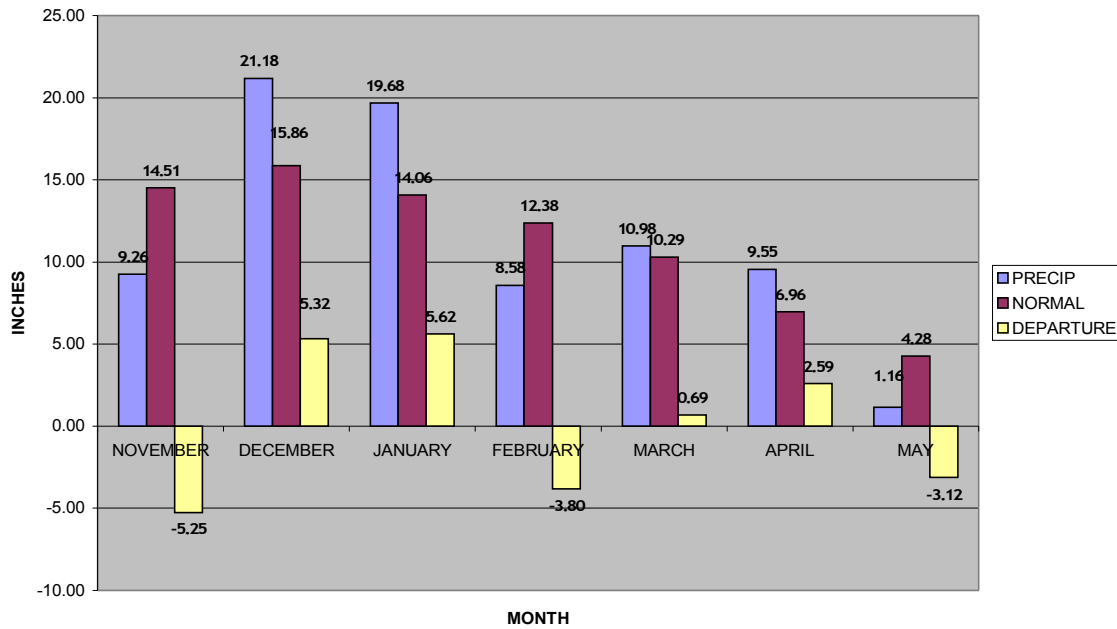


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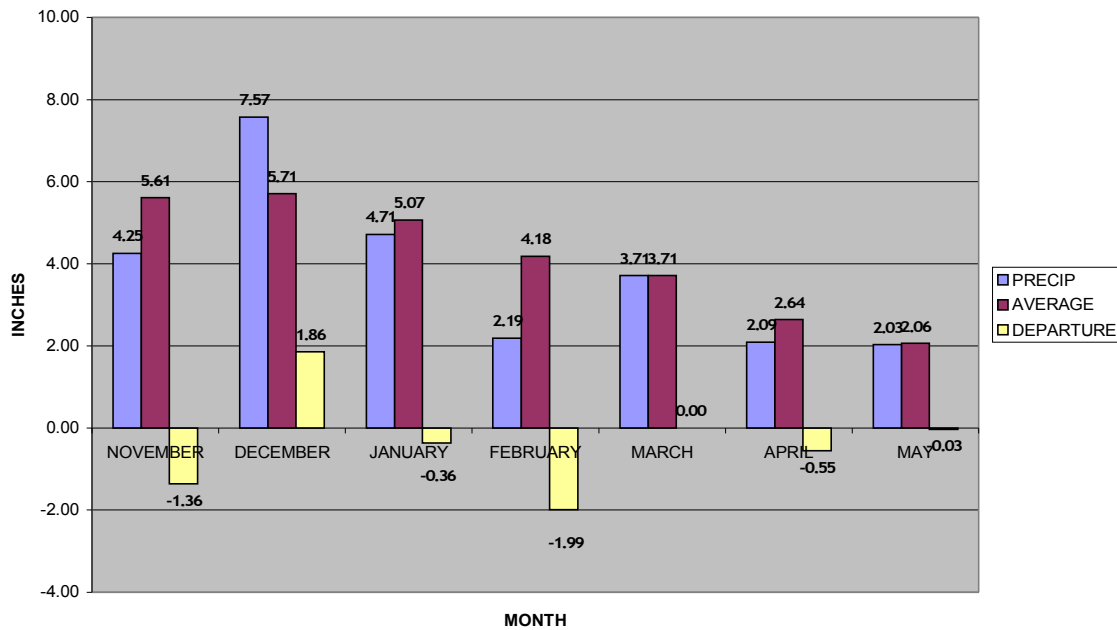


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2007-2008 WET SEASON ALSEA-FALL CREEK

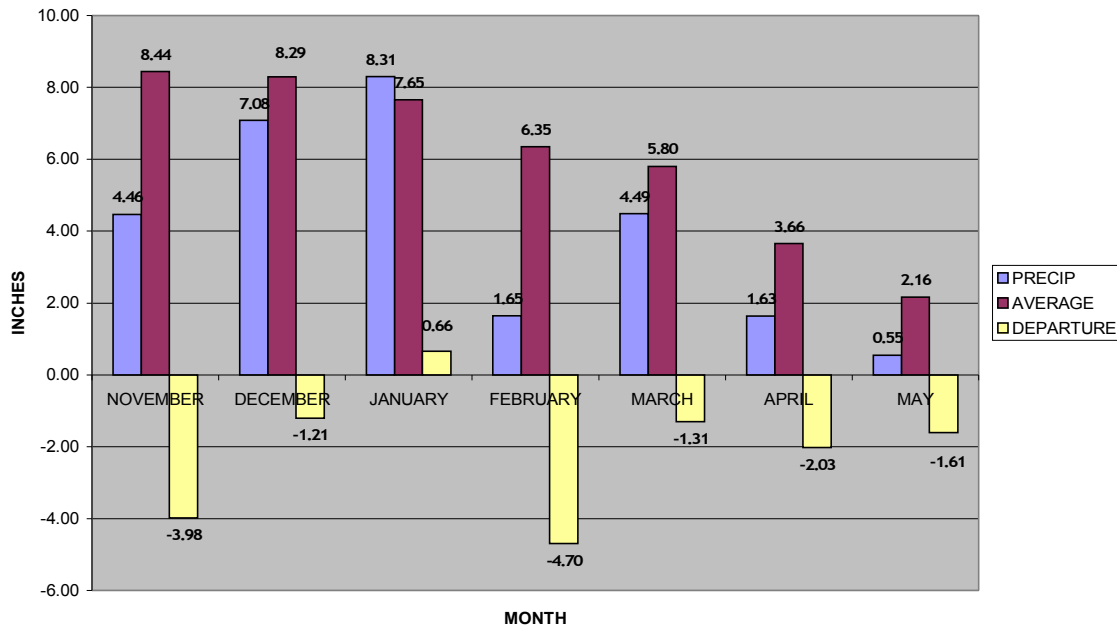


2007-2008 WET SEASON PORTLAND

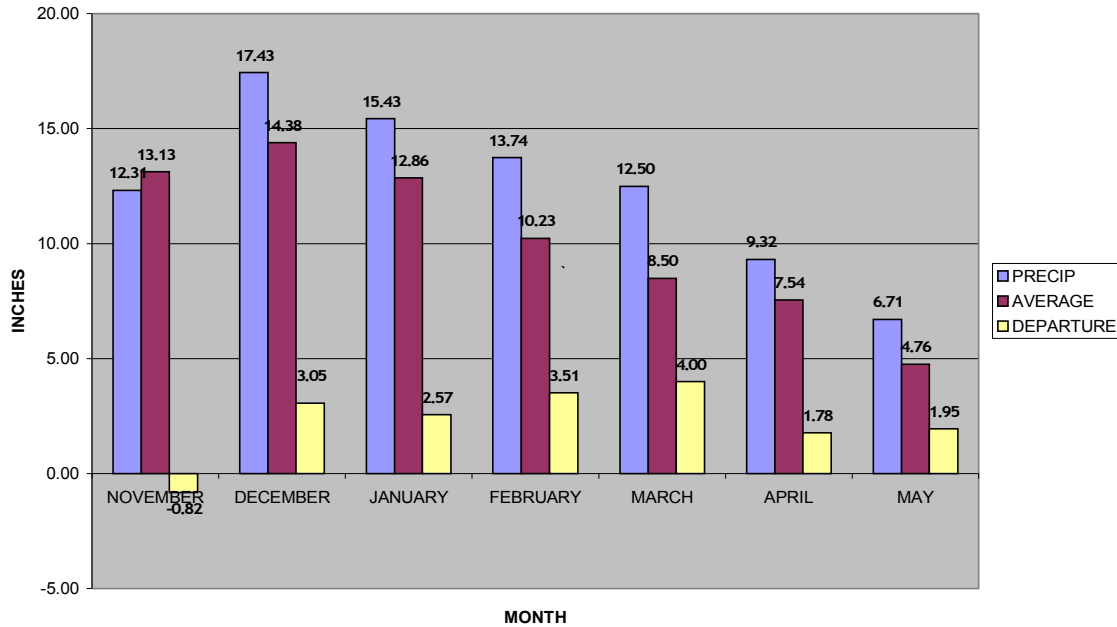


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2007-2008 WET SEASON EUGENE

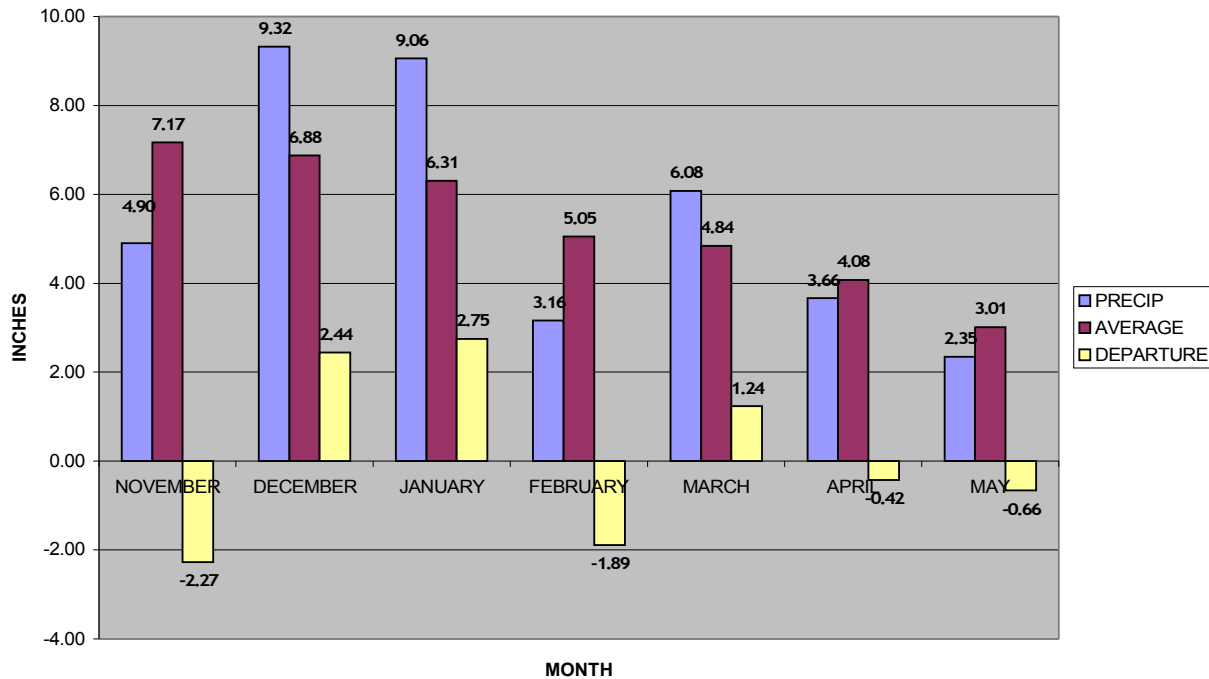


2007-2008 WET SEASON GOVERNMENT CAMP



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2007-2008 WET SEASON OAKRIDGE



FAST FACTS: A series of strong storm systems in early October produced substantial rainfall over the district, especially in the North Oregon and South Washington Cascades and foothills and the Coast Range. Rainfall totals for October 3rd included 1.88 inches at Cedar Creek, 1.87 inches at Cannibal Mountain, 1.86 inches at Rye Mountain, 1.59 inches at Wilkinson, and 1.59 inches at South Fork. The storm continued on October 4th. Rainfall totals included: 2.88 inches at Yellowstone, 1.92 inches at Emigrant, 1.90 inches at South Fork, 1.61 inches at Village Creek, 1.54 inches at Goodwin Peak, and 1.52 inches at Locks.

Strong subsidence inversions during mid-September resulted in very poor humidity recovery in the Cascades. Maximum humidity values in the North Oregon and South Washington Cascades and foothills (zones 605, 607, and 660) were generally in the 20s and 30s. The maximum RH at Horse Creek was only 24 percent. Log Creek registered 27 percent and Wanderer's Peak only reached 30 percent. Similar conditions existed in the Lane County Cascades and foothills. Yellowstone observed a recovery of only 20 percent, Pebble had 24 percent, and Brush Creek reported 33 percent.

A strong upper ridge and surface thermal trough produced Red Flag conditions in the Cascades September 15th and 16th. Many inland areas had high temperatures in the 90s on the 16th. Emigrant managed to reach 100 degrees. Other notable highs included 96 at Red Box, 96 at Pebble, and 95 at Fields. The Gnarl Ridge Fire, round two, exhibited extreme fire behavior on September 16th, which resulted in substantial fire spread.

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2007-2008 SNOWPACK DATA (FOR GOVERNMENT CAMP)

The 2007-2008 Government Camp snow-depth data (Figure 3) is shown on page 11. The chart also includes data from 2006-2007 and the average snow depth. The 2007-2008 snowfall was substantial, as compared to the previous year. The maximum snow depth of 140 inches on February 8th easily surpassed the 2007 peak of 63 inches, measured on March 3rd. Early season snowfall yielded a depth of four feet by December 2nd. The snow pack dwindled to 16 inches by December 14th, but was up to 70 inches by the end of month. The snow depth remained near or above 70 inches from January 6th to January 26th, then increased from 70 inches to 140 inches by February 8th, a change of nearly six feet in two weeks. By the end of February the snow depth had fallen to 79 inches. However, snow water equivalent values at the end of February were nearly 175 percent of normal for the Hood River and Willamette River Basins. These values increased to almost 200 percent of normal by the end of March. The snow depth rose to slightly over 100 inches by the end of March, and remained near 90 inches until April 25th. There was 16 inches of snow on the ground as late as May 23rd. It is unclear whether the 16 inches disappeared on the next day, or whether the Government Camp site ceased reporting. The end of May was somewhat wet and cool, which makes it unlikely that the snow depth went from 16 inches to 0 in one day. Two inches were reported on June 10th, but were gone by the next day.

Snow cover vanishes, on average, by June 10th. The past three years have been unusual. In 2005, the snow cover was gone by April 19th, but there was not nearly as much snow to melt compared to 2006. The snow lasted one week longer in 2006 compared to 2005. In 2007, the snow was gone by April 22nd, which is a striking contrast to this year when 93 inches was on ground.



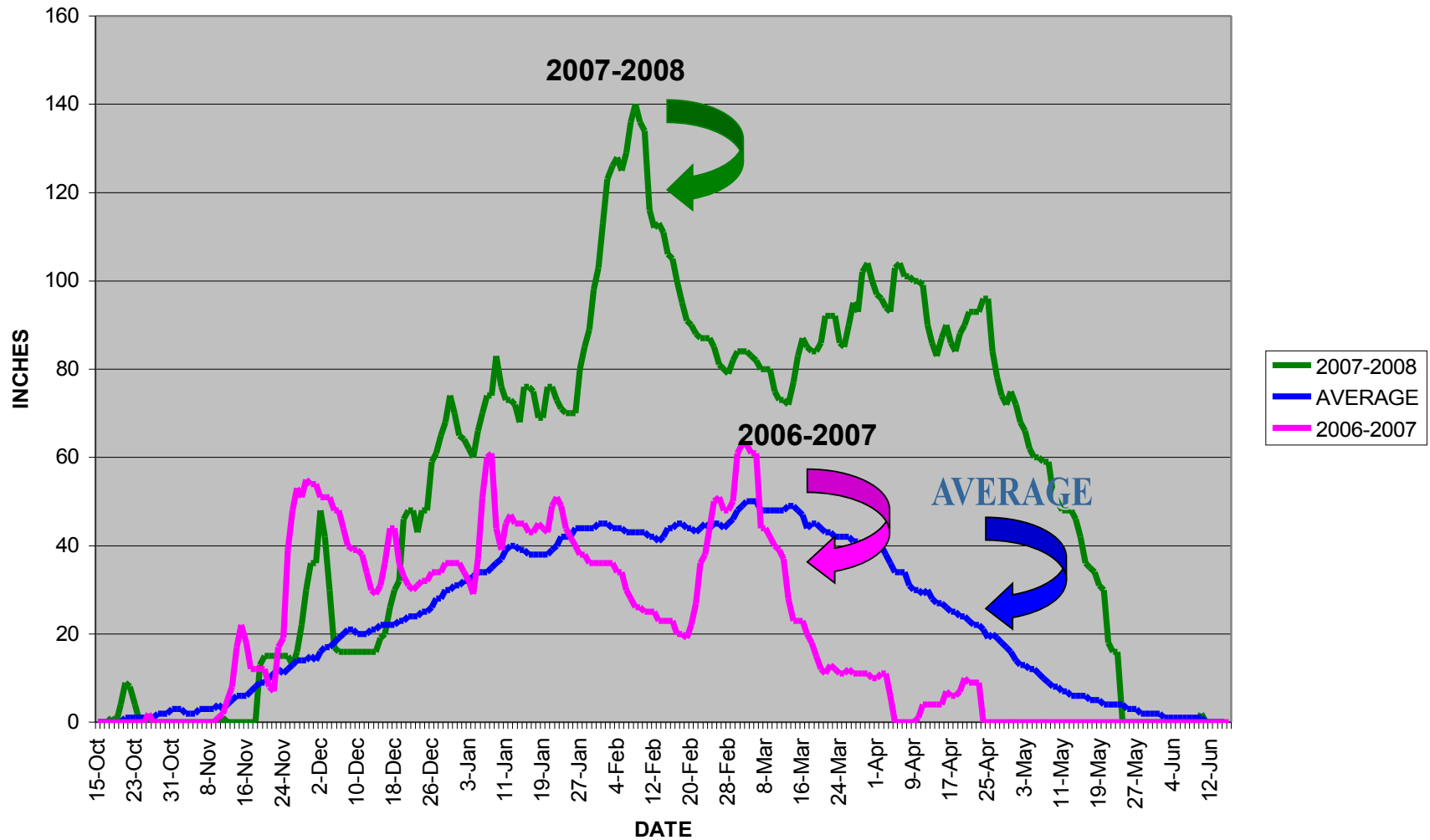
INTERESTING TIDBITS: According to the Northwest Coordination Center, there were 70 large fires in the Pacific Northwest Region, compared to 89 fires last year. The 70 large fires burned 249,399 acres, which is far less than the 763,394 acres of 2007. It is interesting to note that despite burning only about one-third the acres compared to 2007, the total fire-fighting costs for both years were nearly identical. The most expensive large fires for 2008 were:

<i>Rattle Fire</i>	<i>Umpqua</i>	<i>\$21.1 million</i>
<i>Lonesome Complex</i>	<i>Rogue River</i>	<i>\$18.4 million</i>
<i>Gnarl Ridge Fire</i>	<i>Mt. Hood</i>	<i>\$15.0 million</i>
<i>Cold Springs Fire</i>	<i>Gifford Pinchot</i>	<i>\$9.9 million</i>
<i>North Fork Complex</i>	<i>Umpqua</i>	<i>\$6.7 million</i>

Large fires in Oregon burned 135,094 acres at a cost of \$114.1 million. Washington large fires burned 114,305 acres for a cost of \$44.7 million.

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FIGURE 3 - GOVERNMENT CAMP SNOWDEPTH



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2008 FIRE SEASON LIGHTNING DATA

Table two shows the lightning frequency, by area, for the 2008 season.

TABLE TWO: 2008 LIGHTNING DATA (MAY THROUGH OCTOBER)

AREA	# LIGHTNING DAYS 2008	AVE. # DAYS (LAST 15 YEARS)	PERCENT AVE.
ZONES 601/612	2	6.73	29.7%
ZONES 602/603	8	7.33	109.1%
ZONE 604	8	8.47	94.5%
ZONES 605/607/660	8	12.53	63.8%
ZONES 606/608	10	17.47	57.2%

TABLE TWO: 2008 LIGHTNING FREQUENCY. DATA OBTAINED FROM BLM LIGHTNING DETECTION AND NORTHWEST COORDINATION CENTER

An item of interest in the lightning frequency data is the relatively low frequency of occurrence for the Cascade and foothill zones. Specifically, the Lane County Cascades and foothills, zones 606 and 608, had 10 lightning days in 2008. This is slightly over 50 percent of average. In fact, lightning frequency for zones 606 and 608 has shown a steady decline since 2004. Another interesting note was the lightning frequency in the Coast Range, zones 602 and 603. There were 8 lightning days in 2008, the same amount as the North Oregon and South Washington Cascades and foothills. The 2008 lightning frequency for the Coast Range was much less than the 20 days of 2004 and 2005. Typically, there is a lightning maximum in May due to a climatological tendency for cold, upper-level lows to move across the Pacific Northwest. This did not occur in 2008. The latter half of May was cool and moist, but there were only two lightning days for zones 606 and 608, one in the remaining inland zones, and none for the coastal zones. The peak lightning period occurred in mid-August. A dry and unstable air mass developed on the 13th and lasted through the 16th. This Haines 6 Red Flag event was immediately followed by a lightning event. A Red Flag was issued on August 17th, but lightning occurred on the 16th. There was no warning issued for the 16th. The Fire Potential Outlook from the Northwest Coordination Center showed critical fuel indices on the 16th. Lightning strikes were noted in most inland zones, with several starts on the night of the 16th and early on the 17th. The Clackamas Complex, 536 acres, needed a Type III Management organization. Two other complex fires that originated from the lightning episode, the Middle Fork and Rattle, needed Type II Incident Management organizations. Climatologically, the first major lightning episode occurs around July 21st.

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Problem lightning, formerly referred to as episode lightning, was not a major factor in 2008. Normally, one or two critical fire weather patterns or events occur during the fire season that

likely result in problematic lightning. Such events include the breakdown of an upper ridge, Haines 6 conditions, or lightning after an extended dry period. These isolated events cause the majority of large fires. There were two problematic lightning episodes during the 2008 season, as mentioned on the previous page. The Portland Forecast Office issued Red Flag Warnings for six events during the 2008 season. One was for an east-wind episode, one was for lightning, and the other four events were for Haines 6 situations. The most critical fuel conditions during the past couple of seasons have occurred in early to mid-September.

The lightning criteria for the Portland forecast area were modified over the past couple of seasons in an attempt to better represent the true problem patterns. Dry lightning is hard to forecast and harder still to verify. The Northwest Coordination Center developed a more objective analysis for problem lightning. The general premise is to combine lightning potential with observed and forecast fuel conditions. A Red Flag Warning is warranted when lightning is expected **AND** fuel conditions are forecast to remain moderate or critical during and after the weather event. Also, lightning activity must be scattered, or greater, in coverage.



Figure 4 – Cold Springs Fire Gifford Pinchot NF. Photo courtesy of Julia Ruthford, IMET.

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RED FLAG WARNING STATISTICS FOR 2008

Table three shows the Red Flag verification statistics for the 2008 fire season.

TABLE THREE (ALL WARNINGS)

ZONE	# RFW	CORRECT RFW (A)	INCORRECT RFW (B)	MISSED EVENTS (C)	POD A/(A+C)	CSI A/(A+B+C)	FAR (1-[A/ (A+B)])
601	0	0	0	0	0.00	0.00	0.00
612	0	0	0	0	0.00	0.00	0.00
602	1	1	0	1	0.50	0.50	0.00
603	2	1	1	1	0.50	0.33	0.50
604	3	3	0	2	0.60	0.60	0.00
605	4	4	0	1	0.80	0.80	0.00
606	5	4	0	1	0.80	0.80	0.00
607	4	4	0	1	0.80	0.80	0.00
608	6	6	0	1	0.86	0.86	0.00
660	3	3	0	0	1.00	1.00	0
TOTALS (ALL)	28	26	1	8	0.765	0.743	0.038
LIGHTNING	8	8	0	5	0.615	0.615	0.000
WIND/RH	1	1	0	1	0.500	0.500	0.000
HAINES 6	19	17	1	2	0.895	0.850	0.056

NUMBER OF WARNED EVENTS: 6
EVENTS PRECEDED BY A WATCH: 3 OR 50%
MISSED EVENTS: 1

NOTE: Refer to the Annual Operating Plan for complete Red Flag criteria.

EVENT LEAD TIMES

Tables 4 and 5 show the respective warning and watch lead times for all events in 2008.

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TABLE FOUR – WARNING LEAD TIMES

<i>EVENT</i>	<i>RANGE OF LEAD TIMES</i>	<i>AVE. ZONE LEAD TIME</i>
<i>July 12 (Haines 6)</i>	No lead time zones 606 and 608	0 HRS 00 MINS
<i>August 14-16 (Haines 6/Low RH)</i>	21 hrs 51 min ZONE 606 22 hrs 22 min ZONE 660 23 hrs 23 min ZONE 608 27 hrs 23 min ZONE 604 27 hrs 36 min ZONE 607 33 hrs 09 min ZONE 605	25 HRS 57 MINS
<i>August 17 (Lightning)</i>	1 hr 55 min ZONE 602 2 hrs 55 min ZONE 608 6 hrs 55 min ZONE 607 7 hrs 55 min ZONES 603, 604, and 606 8 hrs 55 min ZONE 605 10 hrs 55 min ZONE 660	6 HRS 55 MINS
<i>September 11 (Low RH and east wind)</i>	24 hrs 01 min ZONE 604	24 HRS 01 MINS
<i>September 11 (Haines 6)</i>	No lead time zones 605, 606, 607, 608	0 HRS 00 MINS
<i>September 14-16 (Haines 6)</i>	34 hrs 22 min ZONE 660 35 hrs 09 min ZONE 605 36 hrs 47 min ZONE 606 37 hrs 23 min ZONE 608 38 hrs 36 min ZONE 607	36 HRS 27 MINS
<i>September 29 (Haines 6)</i>	12 hrs 28 min ZONE 608	12 HRS 28 MINS
<i>OVERALL AVE. LEAD TIME</i>		16 HRS 32 MINS

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TABLE FIVE – WATCH LEAD TIMES

<i>EVENT</i>	<i>RANGE OF LEAD TIMES</i>	<i>AVE. ZONE LEAD TIME</i>
<i>July 8 (Low RH and east wind ZONE 603)</i>	WATCH ISSUED 1220 JULY 7 THEN CANCELED 0839 JULY 8	
<i>July 13 (Haines 6)</i>	NO WATCH ISSUED	NO WATCH ISSUED
<i>August 14-16 (Haines 6)</i>	NO WATCH ISSUED	NO WATCH ISSUED
<i>August 17 (Lightning)</i>	NO WATCH ISSUED	NO WATCH ISSUED
<i>September 11 (Haines 6, Low RH, wind)</i>	32 hrs 41 min ZONE 605 32 hrs 55 min ZONE 608 36 hrs 08 min ZONE 607 36 hrs 23 min ZONE 606 44 hrs 45 min ZONE 604	36 HRS 34 MINS
<i>September 15-16 (Haines 6)</i>	57 hrs 23 min ZONE 660 58 hrs 10 min ZONE 605 59 hrs 48 min ZONE 606 60 hrs 24 min ZONE 608 61 hrs 37 min ZONE 607	59 HRS 28 MINS
<i>September 29 (Haines 6)</i>	35 hrs 09 min ZONE 608	35 HRS 09 MINS
OVERALL AVE. LEAD TIME		46 HRS 51 MINS

A few notes on verification and the 2008 events: The overall severity of any fire season is highly correlated with the extent and frequency of critical fire weather patterns during the season. It is not unusual to have an extended dry period during any given fire season. This, in itself, could result in an elevated degree of fire activity, provided the fuel conditions are right. However, to elevate a high fire danger situation to a critical level normally requires an additional weather element, or trigger, to be superimposed on the dryness factor. This additional trigger could be thunderstorms with no appreciable precipitation, an extremely unstable air mass (Haines 6), or a combination of strong wind and low humidity. Red Flag warnings are issued when a combination of critical weather elements exist **WITH** sufficiently dry fuels and severe burning conditions.

Determining lead-time for problematic or dry lightning is highly subjective. The Portland office has made a major effort to get away from the term *dry lightning*. In 2004, new lightning criteria were introduced to the users. However, the definition of episode lightning was misunderstood. Therefore, in 2005, the phrase *lightning with no appreciable precipitation* was introduced. The general premise was to avoid the subjectivity of determining whether lightning was wet or dry. If the fuel conditions were expected to remain high or critical during and after the lightning event, then a Fire Weather Watch or Red Flag warning was warranted. The Northwest Coordination Center developed a scheme to monitor fuel conditions. The two correlating factors were determined to be Energy Release Component (ERC) and 100-hour fuel moisture. It was

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found that there were distinct breakpoints of ERC and 100-hour fuel moisture that corresponded to minimal or no large fire potential, an average risk of large fire potential, and a higher than average risk of large fire potential.

It is a given that fires **WILL** occur during or after a lightning episode following an extended dry spell. However, does that fact alone warrant a Red Flag warning? If all the resultant fires remain small and/or initial attack can handle them, was it a critical event? Should one or more resultant lightning fires get big, then it is reasonable to assume the event was critical and a warning justified.

There were no changes in the Red Flag criteria for the 2008 season. As a review, the wind/low RH criteria are based on distinct geographic and climatic zone groupings. The Portland fire weather region is divided into five regions, and Red Flag criteria for wind and low humidity were assigned to each region. It is also assumed that if one fire weather zone within a region reaches criteria, then, by default, the remaining zones within the region achieves criteria. It is hard to imagine a synoptic-scale east wind event, typical of late spring or late summer, that verifies in the North Oregon Cascade foothills, but **DOES NOT** verify in the adjacent North Oregon Cascades or South Washington Cascades. Verification of wind and low humidity continues to be hampered by RAWs issues. The land agencies have put forth more effort at RAWs maintenance during the past couple of years, but more work needs to be accomplished. Some RAWs sites that were good wind stations in the past, have suffered due to overstory growth, understory expansion, and other environmental factors.

Another verification problem arises when verifying warnings by zone. Multiple zones may be included in a warning, but some areas may not have good verifying observing stations. Some zones end up not meeting warning criteria simply because there are no good verification stations. This, in turn, will result in lower Probability of Detection (POD) scores, and higher False Alarm Rates (FAR). Moving RAWs stations may actually hinder verification. There has been a push in the past couple of years for units or districts to conduct seasonal surveys on their RAWs stations and take appropriate action to clear brush, remove trees, etc in order to conform to RAWs site standards.

NFDRS VERIFICATION STATISTICS FOR 2008

National Fire Danger Rating System (NFDRS) forecasts remain a high priority at the Portland office. Users depend on these forecasts for a variety of reasons, such as determining whether to limit or curtail forest activities, updating pocketcards, and determining staffing levels. A Memorandum of Understanding (MOU) between the Pacific Northwest Coordinating Group (PNWCG) and National Weather Service used to exist, that specified expected forecast performance measures for NFDRS forecasts. These verification standards were based on performance against persistence. The base performance measures were 35 percent improvement over persistence for temperature, 25 percent improvement for humidity, and 10 percent for wind. However, the MOU also called for a goal of 30 percent improvement each year. Over time, this 30 percent annual

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improvement became unreasonable. The MOU no longer exists. As of 2008, user expectations are to simply show some degree of improvement over time.

The Portland office provided individual NFDRS forecasts for eight sites: Village Creek, Pebble, Fields, South Fork, Wanderer's Peak, Horse Creek, Yellowstone, and Canyon Creek. Table six below shows the 2008 NFDRS verification stations for the above sites. Wind forecasts for Wanderer's Peak were not provided due to an inoperative wind sensor. Yellowstone was out of service through early July, resulting in fewer forecasts compared to the other sites. The values in red indicate improvement over the 2007 scores.

TABLE SIX – 2008 SITE-SPECIFIC NFDRS VERIFICATION

SITE	TEMPERATURE			HUMIDITY			WIND		
	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE	FCST MAE	PERS. MAE	SCORE
<i>Village Creek</i>	4.34	6.79	36.13%	7.99	12.12	34.03%	1.36	1.69	19.43%
<i>Pebble</i>	4.01	7.02	42.93%	9.84	14.66	32.88%	1.47	1.76	16.47%
<i>Fields</i>	4.47	7.84	42.95%	10.14	15.80	35.81%	1.77	2.13	16.84%
<i>South Fork</i>	4.45	6.66	33.30%	10.38	15.35	32.38%	1.55	1.65	6.19%
<i>Wanderer's Peak</i>	4.53	8.17	44.59%	10.34	17.94	42.34%	NF	NF	NF
<i>Horse Creek</i>	4.29	7.35	41.68%	10.43	16.48	36.73%	1.09	1.32	17.74%
<i>Yellowstone</i>	3.75	7.34	48.84%	10.70	18.17	41.12%	1.55	1.68	7.87%
<i>Canyon Creek</i>	5.71	9.06	36.93%	12.28	18.32	32.99%	1.46	1.66	11.95%

MORE 2008 NFDRS VERIFICATION TIDBITS:

The percentage of improvement over persistence for temperature in zone 608 was 41.5 percent, the highest score for any zone. Zone 605 had the highest score for humidity, which was 34.8 percent.

The lowest overall zone-average mean absolute error (MAE) for temperature was 4.22 degrees for zone 608. The highest MAE was 5.80 degrees in zone 660, yet the overall improvement over persistence was 32.0 percent.

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Figure 5 below is a graphical representation of Table 6.

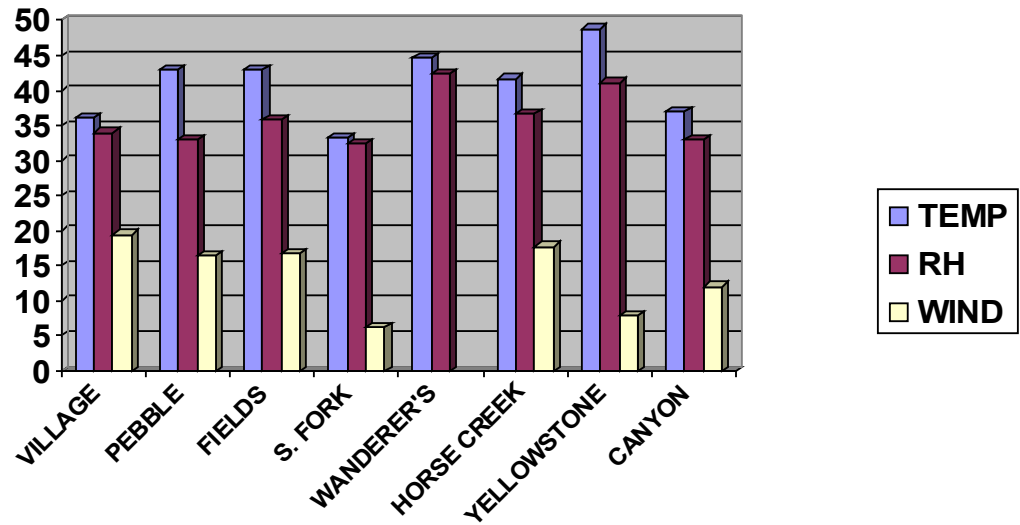


Figure 5 – NFDRS percent improvement over persistence for point forecasts

The following table (Table 7) shows the 2008 NFDRS verification statistics, by area, and by zone.

TABLE SEVEN – 2008 NFDRS VERIFICATION

ZONE	TEMPERATURE	HUMIDITY	WIND
601	25.6%	18.9%	3.5%
602	31.5%	26.9%	-6.1%
603	27.0%	26.9%	7.6%
605	38.3%	34.8%	-1.8%
606	33.0%	27.7%	0.0%
607	34.2%	28.4%	-13.8%
608	41.5%	32.3%	7.7%
612	8.5%	3.9%	4.3%
660	32.0%	31.9%	-3.0%
ALL	33.0%	28.2%	1.2%
2007 ALL	28.0%	22.3%	-4.6%

A more meaningful verification statistic is the mean absolute error (MAE). The total number of forecasts can skew the improvement percentages. There could be a higher

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MAE with a smaller forecast sample and this could still give a high improvement score. For instance, there were 5 forecasts in June for zone 601. The forecaster temperature MAE was 5.40 degrees, the persistence MAE was 8.40 degrees, which yielded an improvement over persistence of 35.7 percent. The 35.7 percent appears excellent, but an MAE of 5.40 degrees is not. The lowest temperature MAE for all stations occurred in October, 4.30 degrees. The persistence MAE was 6.79 degrees. Thus, the improvement over persistence was 36.6 percent. The lowest monthly temperature score occurred in June, at 26.1 percent. The highest monthly temperature score was in August at 40.2 percent.

Zone 612 continued to exhibit the lowest temperature and humidity scores. Part of the problem can be attributed to the lack of observations. There were only 115 forecasts in 2008, a decrease from the 184 in 2007.

Wind can be a difficult element to forecast due to limited variability. Village Creek and Horse Creek typically do not show much wind. This is especially true for Village Creek, where the average afternoon 10-minute wind speed is just 2.8 mph. The 90th percentile wind speed is 5 mph. Thus, it is very difficult to beat persistence at Village Creek. The average afternoon wind speed at Horse Creek is even lower, just 2.2 mph. Surprisingly, forecasters showed an improvement over persistence of 17.74 percent. This is quite good considering the low average afternoon wind speed. Out of nearly 160 observations, Horse Creek reported a wind speed of 5 mph or more at NFDRS observation time on just 9 occasions. Of the eight NFDRS observation points, South Fork continues to show the most wind variability. The median wind speed is 8 mph, and the 90th percentile wind value is 11 mph.

Big-change days are crucial to positive NFDRS statistics. These are golden opportunities to make big points over persistence. Marine surges typically offer the forecaster a chance to obtain plenty of points over persistence. Conversely, marine surges can be the most difficult pattern for NFDRS forecasts. The marine layer may be deeper or shallower than expected, which results in large mean absolute errors. Strong onshore flow could persist for multiple days, but the forecaster may believe the pattern will change sooner. This also results in large errors over persistence. The extent, or lack, of a marine layer and its dissipation heavily influences sites such as Village Creek, South Fork, Canyon Creek and Horse Creek.

NEW FOR 2009:

The NFDRS forecast product in 2009 will be much different. Instead of providing zone-based trends for temperature, humidity, and wind, the 2009 forecast will provide trends for nearly all RAWS sites within the district.

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STATISTICS FOR AREA ONE (COASTAL STRIP ZONES)

This area is comprised of zones 601 and 612. RAWs that represent the area include:

Cedar Creek, Cannibal Mountain, Goodwin Peak, Huckleberry, Dunes, and Tillamook.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			3 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	54.5	39.4	60.0	0	94.5	0	3.88	18.00	0	0	0	0
11- 20	67.9	50.9	52.2	0	84.5	3	2.46	17.38	3	3	2	0
21- 31	53.1	44.3	82.3	0	98.9	0	0.83	20.83	6	1	1	0
June 1-10	52.8	42.7	80.0	0	98.7	0	0.57	25.65	8	7	3	0
11-20	60.1	42.4	61.6	0	96.5	1	2.16	16.47	1	0	0	0
21-30	68.2	49.5	53.2	0	87.2	3	14.38	12.15	1	0	0	0
July 1-10	68.4	52.0	63.3	0	91.3	0	16.13	14.64	1	0	0	0
11-20	69.8	49.6	50.4	0	83.8	4	28.72	11.41	0	0	0	0
21-31	64.7	48.1	61.3	0	96.2	0	27.88	13.85	4	1	0	0
Aug 1-10	66.4	51.6	67.6	0	95.4	1	21.00	16.84	3	1	1	0
11-20	70.1	56.1	71.6	0	92.4	0	22.21	16.00	4	3	2	2
21-31	66.4	50.2	69.0	0	98.0	0	4.33	22.62	4	2	1	0
Sept 1-10	68.5	48.8	57.2	0	94.5	0	14.89	16.29	0	0	0	0
11-20	69.3	50.9	55.5	0	83.6	5	24.20	12.58	0	0	0	0
21-30	65.3	48.8	58.6	0	89.9	3	13.47	19.02	4	2	1	0
Oct 1-10	58.2	51.1	85.2	0	95.4	1	3.75	28.18	6	6	4	0
11-20	NA	NA	NA		NA		NA	NA				0
AVE/TOT.	63.98	48.53	64.31	0	92.55	21	12.55	17.62	45	26	15	2
2007	63.5	48.0	63.2	3	93.8	18	15.49	16.94	53	29	19	6
2006	66.7	49.3	55.6	8	85.8	41	23.1	15.0	35	21	16	5
2005	64.9	49.0	63.5	2	91.5	27	13.7	18.1	65	36	24	18
2004	66.2	51.0	64.5	2	92.2	13	9.6	18.3	55	36	29	13
2003	66.5	49.9	58.9	5	88.6	22	31.4	13.8	32	19	14	14
2002	65.5	49.4	63.6	5	92.0	23	20.3	15.9	37	20	10	3
2001	66.0	47.8	59.3	7	89.8	12	NA	NA	46	30	15	4
2000	69	51	57	11	89	16	NA	NA	32	15	8	5

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DRY SPELL

2008	2007	2006	2005	2004	2003	2002	2001
48 DAYS	29 DAYS	63 DAYS	60 DAYS	53 DAYS	105 DAYS	35 DAYS	22 DAYS

AREA HIGHLIGHTS

OVERVIEW: The coastal zones experienced multiple wet and dry cycles throughout the 2008 season. May started dry, but ended cool and wet. The wet regime persisted through the first half of June, followed by the 7-week dry spell. There was another wet period in mid to late August. September was warm and dry. There were 15 days of wetting rain, slightly less than 2007. There were two lightning days, compared to six in 2007. Both lightning days occurred in mid-August. Despite the prevalence of upper-level troughs in May and June, lightning activity (scattered coverage or more) did not occur.

Average ERC values were much lower in May and June, compared to 2007. However, the dry period from mid-June through late July allowed ERC values to exceed those of 2007. The 10-day average ERC values were above 20 from July 11th through August 20th. Last year, the 10-day average exceeded 20 in one period, July 1-10. ERC values dropped into single-digits at the end of August, but climbed to near 25 by September 20th. Similar to 2007, the average daily ERC value did not exceed 35. The highest single-day ERC average was 34.3 on August 16th.

The dry spell, defined as median precipitation of less than one-tenth of an inch, was 48 days, almost three weeks longer than the dry spell of 2007.

RAWS NOTES: Cannibal RAWS data became available May 15th. Huckleberry RAWS started transmitting on June 12th.

TEMPERATURE

The seasonal average of 64.0 was 0.5 degree warmer than 2007.

The warmest 10-day period: August 11-20 (70.1 degrees).

Number of days when the average high was 90 degrees or higher: **1 – May 16.**

Highest daily average high: **94.0 on May 16th.**

Highest temperatures: ***Tillamook 102 on May 16th.***
Goodwin 96 on May 16th.
Dunes 95 on May 16th.
Cannibal 92 on July 8th and August 14th.

Number of nights the average low was 65 degrees or greater: **1 – May 16.**

Highest nightly average low: **70.4 on May 16th.**

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Highest low temperatures:	<i>Tillamook 74 on May 16th. Cedar Creek 73 on June 28th. Goodwin 72 on August 23rd. Dune 72 on May 16th.</i>
Coldest low temperature:	<i>Cedar Creek 32 on May 1st and 9th. Goodwin 34 on May 9th.</i>

HUMIDITY

There were zero critical daytime humidity days during the season, compared to three in 2007. Critical daytime humidity was defined as at least three stations recording 25 percent or less humidity for at least two hours on any given day. There were 21 critical humidity nights this year compared to 18 in 2007. The lowest 10-day average maximum humidity was 83.6 percent September 11-20. There were four 10-day periods when the average maximum humidity was less than 90 percent. Last year there were three such periods.

Lowest daily average minimum humidity:	<i>26.2% on May 16th. 29.2% on September 11th.</i>
Lowest single-station minimum humidity:	<i>Goodwin 12% on September 8th. Huckleberry 16% on July 11th. Cedar Creek 17% on July 11th. Huckleberry 18% on July 1st.</i>
Number of nights with recovery 55% or less:	<i>2 – May 16th and September 29th.</i>
Lowest nighttime average:	<i>42.8% on May 16th.</i>
Lowest single-station maximum humidity:	<i>Cedar Creek 30% July 12th and September 29th. Cannibal 31% on June 21st. Goodwin 33% on June 21st.</i>

PRECIPITATION

Maximum 24-hour (daily) precipitation:	<i>Huckleberry 2.69 on August 20th. Cedar Creek 2.23 on June 3rd. Cedar Creek 2.21 on June 6th. Cedar Creek 1.88 on October 3rd.</i>
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FUELS

The 2008 season-average ERC of 12.6 was the lowest since 2004. Despite the 48-day dry spell, the seasonal average ERC was nearly three points lower than 2007. The maximum 10-day average was 28.7 July 11-20. The lowest 10-day 100-HR fuel moisture average was 11.4 during the same 10-day period.

Critical ERC Days (40 or higher):	<i>0.</i>
Highest daily average ERC:	<i>34.3 on August 16th.</i>
Highest single-station ERC:	<i>Cannibal 40 on September 16th.</i>

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Cannibal 38 on July 14-16th.

Cedar Creek 37 on July 27th, August 16th, and September 15-16th.

Number of days 100-hr FM was 12 or less: **20** **8 days of 10 or less.**

Lowest daily 100-hr FM: **8.75 on July 15th.**
 9.50 on July 14th.

Lowest single-station value: **Cedar Creek 6 on July 15th.**
 Huckleberry 7 on July 15th.
 Cannibal 7 on July 15th.
 Goodwin 8 on June 21st.

Highest daily 100-hr FM: **30.5 on August 21st.**

ERC/100-HR 2007 AND 2008

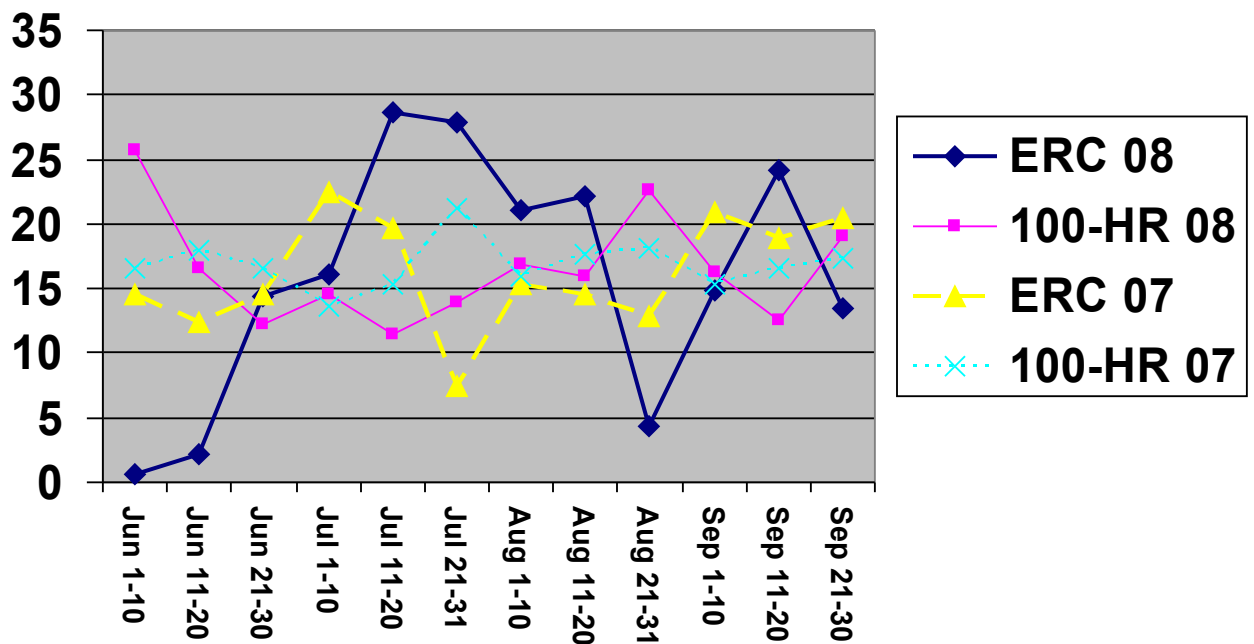


Figure 6 – Fuel Indices Zones 601 and 612

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STATISTICS FOR AREA TWO (COAST RANGE)

This area is comprised of zones 602 and 603. RAWs that represent the area include:

South Fork, Miller, Rye Mountain, Rockhouse1, Wilkinson Ridge, Village Creek, High Point, and Clay Creek.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			5 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	59.8	38.8	47.0	0	88.2	0	8.67	15.12	0	0	0	0
11- 20	70.6	49.6	46.6	1	81.3	3	15.61	13.97	2	1	1	0
21- 31	56.3	43.8	73.2	0	95.3	0	14.37	15.92	3	0	0	1
June 1-10	55.5	41.7	72.0	0	94.7	0	8.60	19.36	7	6	2	0
11-20	68.9	43.3	45.1	0	90.9	0	14.70	15.09	0	0	0	0
21-30	77.8	51.7	38.7	1	80.5	4	27.70	10.58	0	0	0	2
July 1-10	79.2	54.0	43.7	2	84.5	3	32.13	11.38	1	0	0	2
11-20	83.3	53.3	30.3	4	73.7	5	44.29	8.93	0	0	0	0
21-31	74.5	49.0	43.4	0	90.7	1	42.82	11.42	0	0	0	0
Aug 1-10	77.1	51.5	46.9	0	91.9	0	41.28	11.76	2	0	0	0
11-20	80.5	57.9	51.0	0	86.9	1	39.78	12.17	3	3	2	3
21-31	71.7	50.8	51.1	0	92.2	0	18.68	18.71	3	2	0	0
Sept 1-10	76.6	50.6	37.4	1	83.8	3	30.61	12.54	0	0	0	0
11-20	77.7	54.3	38.1	3	73.7	6	40.80	9.96	0	0	0	0
21-30	69.1	49.0	47.2	0	85.4	3	29.17	15.42	4	0	0	0
Oct 1-10	59.7	51.0	78.3	0	93.9	1	11.13	21.22	6	5	3	0
11-20	NA	NA	NA		NA		NA	NA				0
AVE/TOT.	71.14	49.39	49.38	12	86.73	30	26.27	14.16	31	17	8	8
2007	69.3	48.8	56.0	5	93.0	16	22.45	15.00	42	18	12	6
2006	72.9	50.1	46.3	18	86.2	37	30.2	13.7	30	18	9	8
2005	70.8	50.2	51.9	9	88.8	23	23.1	15.8	55	25	13	20
2004	71.5	50.6	54.9	8	93.4	14	17.9	16.3	45	29	16	20
2003	73.0	50.4	48.5	16	88.2	13	33.7	13.7	25	15	7	14
2002	71.9	48.7	48.8	6	90.3	22	29.2	13.9	34	17	7	5
2001	75.1	48.7	44.2	19	93.3	12	NA	NA	29	17	8	2
2000	73	51	55	7	90	12	NA	NA	33	11	4	4

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DRY SPELL

2008	2007	2006	2005	2004	2003	2002	2001
68 DAYS	38 DAYS	63 DAYS	83 DAYS	53 DAYS	80 DAYS	78 DAYS	32 DAYS

AREA HIGHLIGHTS

OVERVIEW

The Coast Range zones exhibited a more pronounced fire season in 2008 compared to 2007. The 68-day dry spell was the longest since 2005, and 30 days longer than last year. The average ERC value was four points higher, 26 vs. 22. More importantly, 10-day average ERC values exceeded 40 for nearly 40 days. Last year, the highest 10-day average ERC value was 31.1. Average ERC values reached critical levels, 45 or more, on 12 days, compared to just one day in 2007. Critical daytime humidity, 25 percent or less, occurred on 12 days, compared to five days last year. The average daytime humidity of 49 percent was almost seven percent lower than the 2007 average. Subsidence inversions seemed to be more prevalent in the Coast Range. The average nighttime humidity value for the 2008 season was 86.7 percent or nearly six percent lower than the 2007 seasonal average. There were 30 critical humidity nights, defined as an average humidity of 60 percent or less. Last year there were 16 such nights. The majority of wetting rain days took place from mid-May through early-June and in early October. The only other wet period occurred in mid-August. In fact, three of the eight total lightning days occurred in mid-August.

Lightning frequency was slightly higher compared to 2007. There were eight lightning days in 2008, compared to six last year. The surprising aspect was the fact that no lightning days occurred after mid-August. Despite fuels reaching critical levels in September, lightning was not a factor. However, offshore events and Haines 6 events were more frequent than normal.

RAWS NOTES: Clay Creek RAWS had suspect humidity values in May and June. Abernathy Mountain RAWS was inoperable for the entire season. A mid-November e-mail from Washington DNR stated Abernathy would be back on-line in 2009.

TEMPERATURE

The seasonal average of 71.1 was nearly two degrees warmer than 2007.

The warmest 10-day period: **July 11-20 (83.3 degrees).**

Number of days when the average high was 90 degrees or higher: **11.**

Highest daily average high: **97.5 on August 16th.**
97.4 on June 28th.

Highest temperatures: **Wilkinson 103 on June 28th.**
Wilkinson 102 on July 9th, 13th and August 14th.
Rockhouse 101 on June 28th.
High Point 101 on August 16th.

Number of nights the average low was 65 degrees or greater: **3.**

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Highest nightly average low: **65.8 on June 28th and July 13th.
64.6 on July 9th.**

Highest low temperatures: **Rockhouse 77 on August 15th.
South Fork 74 on August 15th.
Rockhouse 72 on August 16th.**

Coldest low temperatures: **Rye Mountain 32 on May 1st.
South Fork 32 on May 1st.
High Point 33 on May 1st.**

HUMIDITY

There were 12 critical daytime humidity days during the season, compared to 5 in 2007. Critical daytime humidity was defined as at least four stations recording 25 percent or less humidity for at least two hours on any given day. The lowest 10-day average minimum humidity was 30.3 percent July 11-20th. Last year, the lowest 10-day minimum was 40.1 percent. There were four 10-day periods with an average daytime humidity of 40 percent or less.

Lowest daily average minimum humidity: **16.5% on July 12th.
17.8% on July 13th.
18.4% on September 11th.**

Lowest single-station minimum humidity: **Clay Creek 12% on July 12th.
Rockhouse, Rye Mountain, and
Village Creek 14% on July 12th.**

Number of nights with recovery 55% or less: **6.**

Lowest nighttime average: **43.0% on July 12th.
44.1% on July 13th.
47.4% on September 29th.**

Lowest single-station maximum RH: **Village Creek 26% on June 21st.
Rye Mountain 29% on July 12th.
Rockhouse 30% on July 12th and
September 29th.**

PRECIPITATION

Maximum 24-hour (daily) precipitation: **South Fork 1.90 on October 4th.
Rye Mountain 1.86 on October 3rd.
Village Creek 1.61 on October 4th.**

FUELS

The 2008 season-average ERC of 26.3 was the highest since 2006. Average ERC values climbed into the mid-teens during the middle and latter parts of May, but then fell into single-digits in early June. Average ERC values reached 30 by early July and remained above 30 until the end of August. A wet spell at the end of August dropped ERC values below 20, but a warm and very dry September resulted in average ERC values above 40 as late as September 20th.

Critical ERC Days (45 or higher): **12.**

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Highest daily average ERC: **50.4 on July 15th.**
 47.1 on July 16th.
 46.9 on July 17th.

Highest single-station ERC: ***Village Creek 60 on July 15th.***
 High Point 57 on July 14th and 15th.

Number of days 100-hr FM was 10 or less: **31.** Days of 8 or less: **6**

Lowest daily 100-hr FM: **6.5 on July 15th.**
 8.0 on July 16th.

Lowest single-station value: ***Rockhouse 5 on multiple days.***
 Village Creek 5 on July 14th and 15th.

Highest daily 100-hr FM: **28.5 on October 6th.**
 Fire Season – 25.0 on August 21st.

MAX T/MIN RH 2007 AND 2008

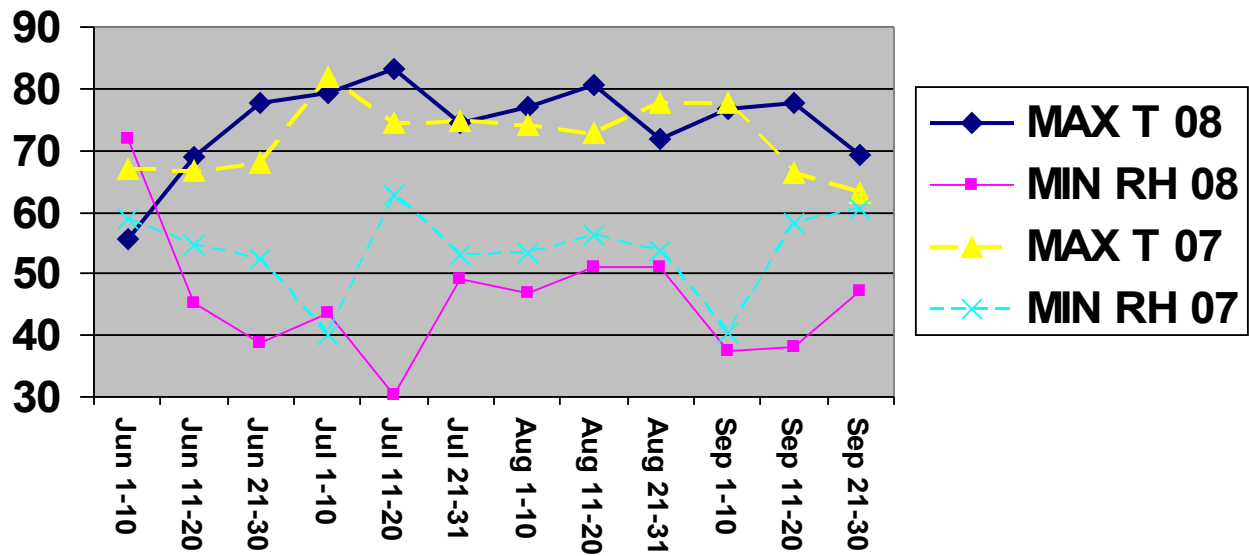


FIGURE 7 – MAX TEMP AND MIN RH ZONES 602 AND 603

PORTLAND FIRE WEATHER – 2008 ANNUAL REPORT
STATISTICS FOR AREA THREE (SOUTH WASHINGTON CASCADES, NORTH OREGON CASCADES, AND FOOTHILLS)

This area is comprised of zones 605, 607 and 660. RAWs that represent the area include:

Log Creek, Red Box Bench, Horse Creek, Eagle Creek, Blue Ridge, Elk Rock, Trout Lake, Canyon Creek, Stayton, Hamilton, Locks, Dry Creek, and Wanderer's Peak.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			6 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	56.3	37.3	50.7	0	93.4	0	2.98	21.77	1	0	0	0
11- 20	66.3	47.4	52.9	0	88.2	3	7.70	20.88	5	2	1	0
21- 31	53.0	43.2	81.0	0	98.6	0	3.87	24.63	7	4	0	1
June 1-10	52.6	40.8	74.9	0	98.1	0	4.91	22.86	7	5	4	0
11-20	64.8	41.5	45.7	0	94.9	0	8.56	19.86	0	0	0	0
21-30	76.7	51.6	34.7	1	82.2	3	18.18	14.51	0	0	0	1
July 1-10	75.8	54.1	44.3	0	87.0	3	21.78	13.02	2	0	0	1
11-20	80.4	52.2	27.3	5	73.6	6	36.64	8.77	0	0	0	0
21-31	71.4	48.1	42.9	0	89.9	2	34.47	11.14	2	0	0	0
Aug 1-10	74.5	52.8	47.4	2	87.7	3	31.10	12.84	2	1	0	1
11-20	80.9	59.3	46.7	3	81.9	4	36.69	11.68	3	2	1	3
21-31	67.3	47.8	54.9	0	95.0	0	16.46	18.93	4	2	1	1
Sept 1-10	72.7	47.5	38.8	2	87.4	3	26.69	14.05	0	0	0	0
11-20	77.0	53.2	35.0	5	66.7	8	40.16	9.13	1	0	0	0
21-30	66.9	46.3	47.8	1	83.6	4	24.04	17.04	4	4	0	0
Oct 1-10	58.0	48.7	74.7	0	92.1	1	13.74	18.89	6	5	3	0
11-20	NA	NA	NA	0	NA	0	NA	NA				0
AVE/TOT.	68.41	48.24	49.98	19	87.52	40	20.50	16.25	44	25	9	8
2007	67.5	47.3	50.8	13	89.6	17	24.0	14.3	48	24	16	14
2006	71.1	48.9	43.3	30	82.1	45	27.7	14.3	35	24	10	15
2005	67.8	47.8	50.4	15	88.4	29	20.2	16.2	61	38	19	18
2004	68.5	49.3	51.5	14	87.0	33	17.9	16.1	57	37	22	28
2003	70.1	48.7	46.9	27	84.7	25	32.2	13.5	33	23	13	15
2002	68.5	47.2	48.8	13	86.5	30	29.7	13.4	40	22	9	11
2001	66.1	46.9	55.7	4	89.0	23	NA	NA	42	23	25	7
2000	69	49	52	16	87	17	NA	NA	22	13	8	3

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DRY SPELL

2008	2007	2006	2005	2004	2003	2002	2001
51 DAYS	31 DAYS	48 DAYS	37 DAYS	53 DAYS	77 DAYS	70 DAYS	32 DAYS

AREA HIGHLIGHTS

OVERVIEW

This area showed little change in overall temperature and humidity compared to 2007. However, there were six more critical humidity days, and over twice as many critical humidity nights. The 40 critical humidity nights has been exceeded just once since 2000. There were 45 such nights in 2006. Median precipitation days of one-tenth of an inch or less were similar to 2007. The main precipitation difference occurred in the number of wetting rain days. This season there were nine wetting rain days, compared to 16 in 2007. Nearly half of the wetting rain days took place in early June. The dry spell of 51 days was the longest since 2004. The dry spell began on June 11th and ended August 1st.

Fuel conditions were similar to last year. Single-digit average ERC values lasted through June 20th. The average ERC value exceeded 30 by July 10th, and remained above 30 through late-August. A wetting rain event near the end of August lowered the average ERC value to 16 by the 31st. The highest 10-day average ERC, 40.2, occurred in mid-September. Critical ERC values, 45 or greater, occurred on four days, compared to just one in 2007. The 10-day average 100-hour fuel moisture content dipped to 8.8 percent during the period July 11-20th. Last year, the lowest 10-day average was 11.6 percent.

There were only eight lightning days this season, which was well below the seasonal average. However, five of the eight lightning days occurred in August. Another lightning day took place in early July, which resulted in the Cold Springs Fire. The 7000+ acre fire was one of largest ever on the Gifford Pinchot forest.

TEMPERATURE

The seasonal average of 68.4 was about a degree warmer than 2007.

The warmest 10-day period: **August 11-20 (80.9 degrees).**

Number of days when the average high was 90 degrees or higher: 7.

Highest daily average high: **98.8 on August 16th.**
 98.2 on August 15th.
 94.8 on August 14th.

Highest temperatures: **Locks 107 on August 15th.**
 Canyon Creek 106 on August 15th.
 Red Box 106 on August 16th.
 Canyon Creek 104 on August 16th.

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Number of nights the average low was 65 degrees or greater: **3.**

Highest nightly average low: **70.2 on August 17th.**
 69.6 on August 15th.
 69.0 on August 16th.

Highest low temperatures: **Log Creek 79 on August 15th.**
 Canyon Creek 77 on August 16th.
 Canyon Creek 76 on August 15th.
 Horse Creek 75 on August 16th.

Coldest low temperature: **Horse Creek 29 on May 1st.**
 Red Box 29 on May 1st.
 Trout Lake 29 on September 23rd.
 Horse Creek 30 on May 9th.

HUMIDITY

There were 19 critical daytime humidity days during the season, compared to 13 in 2007. Critical daytime humidity was defined as at least six stations recording 25 percent or less humidity for at least two hours on any given day. There were 40 critical humidity nights this year compared to 17 in 2007. The lowest 10-day average minimum humidity was 27.3 percent July 11-20. This coincided with the lowest 10-day average 100-hr fuel moisture. There were three 10-day periods when the average daytime humidity was 35 percent or less. The lowest 10-day average nighttime humidity was 66.7 percent September 11-20th. Critical nighttime humidity, 60 percent or less, occurred on eight of the 10 days.

Lowest daily average minimum humidity: **15.0% on July 12th.**
 18.1% on July 11th.
 18.6% on July 13th.

Lowest single-station minimum humidity: **Locks 10% on July 12th.**
 Log Creek 11% on July 12th.
 Red Box 11% on July 12th and
 September 16th.
 Trout Lake 12% on June 29th.

Number of nights with recovery 55% or less: **12.**

Lowest nighttime average: **40.0% on July 12th.**
 46.4% on September 15th.
 47.7% on August 15th.

Lowest single-station maximum RH: **Horse Creek 20% on July 12th.**
 Blue Ridge 21% on September 19th.
 Log Creek 22% on July 12th.
 Horse Creek 24% on September 11th.

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PRECIPITATION

Maximum 24-hour (daily) precipitation: **Log Creek 3.80 on August 20th.**
 Horse Creek 1.98 on August 20th.
 Blue Ridge 1.60 on August 20th.
 Canyon Creek 1.55 on June 10th.

FUELS

The 2008 season-average ERC of 20.5 was 3.5 points lower than 2007. The 2008 average was skewed by the prolonged early-season wet spell. Single-digit ERC values persisted from May 1 through June 20. Last year, ERC values were above 15 after May 10th. However, the maximum 10-day average this season of 40.2 was nearly 8 points higher than the highest 10-day average in 2007. The lowest 10-day average 100-hour fuel moisture content was 8.8 percent. There were two 10-day periods when the average 100-hour fuel moisture was 10 percent or less. Last year the lowest 10-day average was 11.6.

Critical ERC Days (45 or higher): **4.**

Highest daily average ERC: **46.5 on September 16th.**
 45.6 on August 16th.
 45.5 on September 17th.

Highest single-station ERC: **Dry Creek 59 on August 16th.**
 Stayton 58 on July 15th.
 Locks 57 on July 16th.

Number of days 100-hr FM was 10 or less: **28.** 8 or less: **11.**

Lowest daily 100-hr FM: **6.5 on July 15th.**
 7.2 on September 17th.
 7.2 on August 17th.

Lowest single-station value: **Canyon Creek 5 on July 15th.**
 Horse Creek 5 on July 15th.
 Wanderer's Peak 5 on Sept. 16th.
 Red Box 5 on Sept. 17th.

Highest daily 100-hr FM: **25.7 on May 22nd.**
 Fire-Season: 24.3 on August 21st.

RAWS NOTES: Wanderer's Peak exhibited questionable humidity and dew point readings early in the season. Wind data at the site was not available throughout the season. Elk Rock started transmitting on July 6th. Hamilton RAWS was moved to a new location at the end of July. The new name is 3-Corner Rock.

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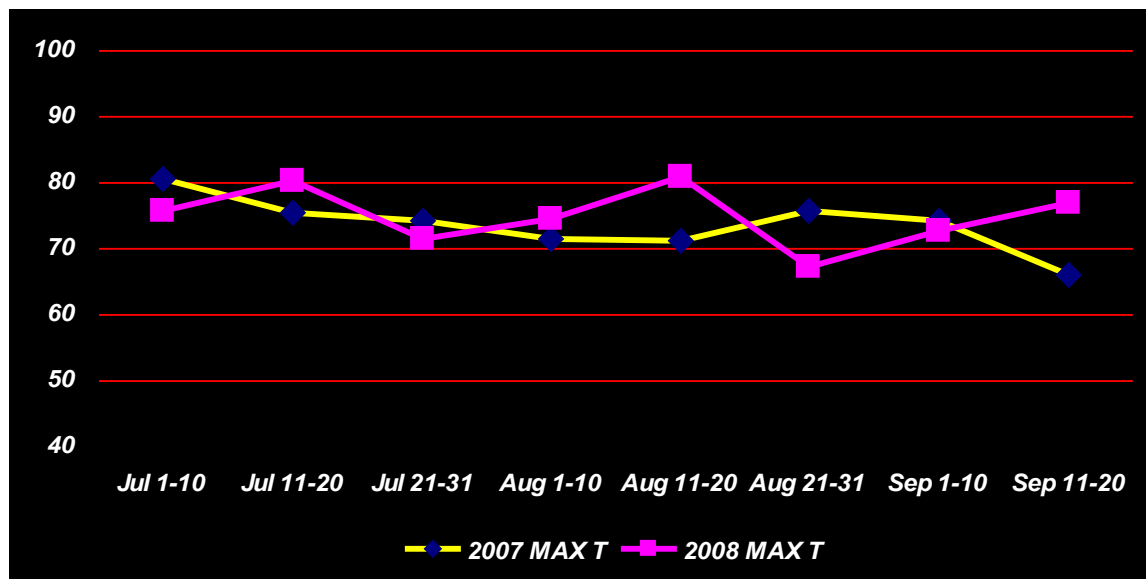


FIGURE 8 – 10-DAY AVERAGE MAX. TEMPERATURES ZONES 605, 607, AND 660

COLD SPRINGS FIRE: The Cold Springs fire was detected July 12th at 1930 PDT, 10 miles northeast of Trout Lake. This lightning-caused fire burned 7,729 acres and was declared contained on August 1st, 2008. The fire made two major runs on July 13th and 14th. A Red Flag Warning for Haines 6/Unstable Air Mass was issued at 0832 PDT on July 12th for fire zones 606 and 608. A warning was not issued for zone 660 because fuel conditions did not meet Red Flag criteria, despite the extreme fire behavior conditions observed on the 13th. The average ERC value on July 12th for zone 660 was 32.0, which was close to the 80th percentile. A warning is normally considered when fuel indices exceed the 85th percentile.



FIGURE 9 – FIELDS RAWs ZONE 608. PHOTO COURTESY OF JULIA RUTHFORD

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STATISTICS FOR AREA FOUR (CENTRAL CASCADES AND FOOTHILLS)

This area is comprised of zones 606 and 608. RAWs that represent the area include:

Boulder Creek, Yellowstone, Trout Creek, Brush Creek, Pebble, Fields, and Emigrant.

	TEMPERATURE		RELATIVE HUMIDITY				FUELS		PRECIPITATION			LTG
			4 OR MORE RAWs MEET CRITERIA FOR 2 HOURS						MEDIAN VALUES			
DATE	AVE MAX	AVE MIN	AVE MIN	DAYS <26%	AVE RECOVERY	NIGHTS <61%	ERC	100 HR	DAYS ≥ .01	DAYS ≥ .10	DAYS ≥ 0.25	DAYS
May 1-10	62.1	36.2	40.6	0	89.6	0	10.37	15.00	1	0	0	0
11- 20	72.6	46.2	41.0	1	79.5	3	13.89	15.00	2	1	1	0
21- 31	53.3	41.1	80.3	0	100.0	0	1.87	23.80	7	6	2	2
June 1-10	55.5	38.8	66.1	0	99.1	0	0.30	22.83	8	5	2	0
11-20	72.2	40.9	36.1	0	89.0	0	8.57	14.09	1	0	0	0
21-30	80.4	49.7	33.1	2	82.0	6	23.70	10.51	2	1	0	2
July 1-10	81.1	53.1	35.9	1	84.8	4	27.02	11.37	0	0	0	1
11-20	83.8	51.3	24.7	4	68.6	6	44.63	7.55	0	0	0	0
21-31	78.2	51.7	36.5	1	87.3	2	43.32	10.49	1	0	0	0
Aug 1-10	83.0	56.7	36.7	1	88.1	3	44.73	10.22	1	0	0	2
11-20	84.7	59.5	40.5	3	80.3	4	44.71	10.99	4	2	1	3
21-31	71.3	47.8	45.5	0	95.2	0	26.01	17.19	3	1	1	0
Sept 1-10	76.7	46.8	32.0	2	82.6	2	35.84	12.24	0	0	0	0
11-20	80.6	53.2	28.5	7	63.2	7	50.64	7.96	0	0	0	0
21-30	72.2	47.6	37.3	5	78.4	4	36.26	14.00	4	1	0	0
Oct 1-10	60.1	48.7	66.4	1	92.7	1	17.98	18.35	6	5	4	0
11-20	NA	NA	NA		NA		NA	NA				0
AVE/TOT.	72.99	48.08	42.58	28	85.03	42	26.87	13.85	40	22	11	10
2007	70.5	46.8	44.8	18	89.4	19	28.9	13.3	35	25	20	12
2006	73.9	48.6	39.6	37	82.0	42	29.4	13.5	33	25	16	17
2005	70.5	47.3	45.6	20	88.7	29	23.7	15.6	58	36	18	19
2004	71.8	49.0	45.6	19	86.5	30	23.3	14.8	43	26	20	24
2003	73.4	49.0	42.3	43	83.5	29	38.8	12.2	30	19	6	17
2002	72.4	47.4	40.7	29	84.6	43	37.5	12.2	30	14	9	13
2001	73.5	47.8	38.0	36	83.5	40	NA	NA	35	29	12	11
2000	75	50	42	21	85	13	NA	NA	19	12	6	7

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DRY SPELL

2008	2007	2006	2005	2004	2003	2002	2001
51 DAYS	30 DAYS	89 DAYS	51 DAYS	73 DAYS	67 DAYS	51 DAYS	22 DAYS

AREA HIGHLIGHTS

OVERVIEW

A look at the overall temperature, humidity and fuels averages would suggest the 2008 fire season was similar to 2007, except for a much higher frequency of critical humidity nights. In reality, the 2008 season was more severe. A cold and wet late-spring drove ERC values to near zero by June 10th. In 2007, ERC values on June 10th were 17. A look at the July-September ERC values gives a much better representation of the 2008 season. Average ERC values on July 20th were at around 45, compared to 33 at the same time last year. Average ERC values peaked at just over 50 in mid-September, or a 97th percentile value. The highest 10-day average in 2007 was 41. Last year, no station recorded an ERC of 70 or higher. In 2008, Emigrant had an ERC of 70 or higher on eight days, with a daily maximum of 78 on September 16th. The Willamette National Forest endured two large fires. The Middle Fork Complex, a myriad of small lightning-caused fires, took place in late-August. The Kitson Springs Fire, a suspected human-caused incident, occurred in late-September.

The peak portion of the fire season was warmer and drier than last year. The highest 10-day average high temperature was 84.7 August 11-20th. A 3-4 day intense heat wave occurred on the 14th through the 16th, was followed by an episodic lightning event on the 17th, and finally a wetting rain on the 19th and 20th. Like the previous couple of years, September was a critical fire period. The Central Oregon Cascades experienced several thermal trough events, some occurring in September. A Red Flag warning was issued as late as September 29th for Haines 6 conditions.

Frequent subsidence inversions resulted in an average nighttime humidity of around 75 to 80 percent from the end of June through late-September. There were three 10-day periods when the average humidity recovery was 70 percent or less. The lowest 10-day average was 63.2 percent September 11-20th. The 42 critical humidity nights equaled 2006.

Precipitation was concentrated in the late-spring and the end of August. Although the frequency of days with median precipitation of .01 or less and .02 to .10 was similar to 2007, there was a big difference in the number of wetting rain days. Last year there were 20 wetting rain days. This year there were 11. The dry spell was 51 days. It started on June 29th and ended on August 18th.

Lightning frequency was a little less than last year. There were 10 days in 2008, compared to 12 in 2007. Half of the lightning days occurred in peak fire season, early to middle August.

TEMPERATURE

The seasonal average of 73.0 was 2.5 degrees warmer than 2007.

The warmest 10-day period: **August 11-20 (84.7 degrees).**

Number of days when the average high was 90 degrees or higher: **14.**

Highest daily average high: **100.1 on August 16th.**

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98.9 on August 15th.

98.4 on August 14th.

97.0 on May 16th.

Highest temperatures: ***Boulder Creek 104 on August 16th.***
Emigrant 103 on August 14th and 15th.
Boulder Creek 103 on August 15th.
Fields 102 on August 16th.

Number of nights the average low was 65 degrees or greater: **4.**

Highest nightly average low: **68.7 on August 17th.**
67.4 on August 16th.
66.7 on August 15th.

Highest low temperatures: ***Emigrant 75 on August 15th.***
Emigrant 74 on August 16th.
Brush Creek 73 on June 28th.

Coldest low temperature: ***Boulder Creek 27 on September 23rd.***
Fields 28 on May 1st and 9th.
Pebble 28 on May 9th.
Emigrant 29 on May 1st.

HUMIDITY

There were 28 critical daytime humidity days during the season, compared to 18 in 2007. Critical daytime humidity was defined as at least four stations recording 25 percent or less humidity for at least two hours on any given day. The lowest 10-day average minimum humidity was 24.7 percent July 11-20. The lowest 10-day humidity recovery period was 63.2 percent September 11-20. Last year, the lowest 10-day average was 80.4 percent.

Lowest daily average minimum humidity: ***12.0% on September 11th.***
15.0% on July 12th.
15.4% on September 16th.

Lowest single-station minimum humidity: ***Emigrant 7% on September 16th.***
Boulder Creek 8% on September 16th.
Fields 9% on September 11th.
Emigrant 9% on September 15th.

Number of nights with recovery 55% or less: **16.**

Lowest nighttime average: ***41.0% on September 11th.***
41.5% on July 12th.
42.3% on September 29th.
43.7% on September 16th.

Lowest single-station maximum RH: ***Emigrant 18% on September 16th.***
Yellowstone 20% on September 11th.
Emigrant 22% on July 12th.

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CRITICAL FIRE WEATHER EVENTS

Critical Fire Weather conditions are those that **COULD** result in extreme fire behavior, or, in the case of problem or dry lightning, an abnormally high number of ignitions. One must be careful when assessing problem lightning. There are times when lightning activity does not meet Red Flag criteria (at least LAL 3 coverage), but does result in a high incidence of project fires.

The overall severity of any fire season is highly correlated with the extent and frequency of critical fire weather patterns during the season. It is not unusual to have an extended dry period during any given fire season. This in itself could result in an elevated degree of fire activity, provided the fuel conditions are right. However, to elevate a high fire danger situation to a critical or extreme level normally requires an additional weather element, or trigger, to be superimposed on the dryness. This additional trigger could be problem or dry lightning, an extremely unstable air mass, or a combination of strong wind and low humidity. Red Flag Warnings are issued when a combination of critical weather exists **WITH** sufficiently dry fuels and severe burning conditions. The Red Flag criteria for the Portland Fire Weather district are listed below:

CRITERIA FOR STRONG WIND AND LOW HUMIDITY (NIGHT)

ZONES 601 AND 602: Two stations must report 35% humidity or less **AND** 10-minute wind speed of 10 mph or more for 3 hours in an 8-hour block.

ZONES 603 AND 612: Rockhouse1 RAWS must report 35% humidity or less **AND** 10-minute wind speed of 15 mph or more for 4 hours in an 8-hour block **AND** one other RAWS must report 35% or less humidity **AND** 10-minute wind speed of 10 mph or more for 2 hours.

ZONE 604: Two stations (airports) must report 30% humidity or less **AND** 2-minute wind speed of 15 mph or more for at least 4 hours in an 8-hour block.

ZONES 605, 607, AND 660: One station must report 35% humidity or less **AND** 10-minute wind speed of 10 mph or more for 4 hours in an 8-hour block **AND** at least **TWO** other stations must report 35% or less humidity **AND** 10-minute wind speed of 10 mph or more for at least 2 hours.

ZONES 606 AND 608: One station must report 30% humidity or less **AND** 10-minute wind speed of 10 mph or more for at least 4 hours in an 8-hour block **AND** one other station must report the same for at least 1 hour

CRITERIA FOR STRONG WIND AND LOW HUMIDITY (DAY)

At least 2 stations within a zone must report 25% humidity or less **AND** wind speed of 10 mph or more (except 15 mph in zone 604) for at least 4 hours in an 8-hour block.

CRITERIA FOR DRY AND UNSTABLE AIR MASS (HAINES 6)

At least **ONE** station within a zone must report 25% humidity or less **AND** show a high-level Haines value of 6 **AND** fuel conditions (Dryness Levels) are in the “BROWN”. At forecaster discretion, can also be issued when Dryness Levels are “YELLOW”.

PROBLEM LIGHTNING

Dryness Levels **MUST** be in the “BROWN” and expected lightning frequency is such that multiple starts (about 5-7) are expected. Typically scattered or LAL 3 coverage. At forecaster discretion, can also be issued when Dryness Levels are “YELLOW”.

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There were six critical fire weather events during the 2008 fire season. One event was for lightning, another was for wind and low humidity, and four were for dry and unstable air mass patterns.

1. JULY 12-13, 2008 HAINES 6/DRY AND UNSTABLE AIR MASS

This was the first of four Haines 6 Red Flag events. At 1700 PDT on July 12th a strong upper level ridge was centered over Southern Nevada. The ridge axis extended through Central Oregon to near the west slopes of the Washington Cascades. A surface thermal trough was also over North-Central California and extended into the Central Oregon Cascade foothills. The Salem upper air observation taken at 0500 PDT on the 12th indicated a high-level Haines value of 6. The 1700 PDT observation from Medford showed a high-level Haines of 6. A Red Flag warning was issued at 0832 PDT on the 12th for zones 606 and 608. The warning was valid that morning through 1700 of the 13th.

An onshore push began late in the afternoon of the 13th. The thermal trough was located near the Central Oregon Cascade foothills at 0500 of the 13th, but had a portion of it had moved to near the Cascade Crest by 1400 PDT. By 2200 PDT the thermal low had moved to the Columbia Basin as onshore flow intensified.

VERIFICATION: Emigrant RAWS observed humidity of 15 percent or less and wind gusts of 15 to 20 mph from 1553 PDT through 1853 PDT. Trout Creek RAWS, in zone 606, observed humidity of less than 25 percent. Pebble RAWS, zone 608, noted humidity of 20 percent or less at 0853 PDT on the 13th and wind gusts to 15 mph at 1453 PDT. A Fire Weather Watch was not issued and there was no lead time. The thermal trough appeared to extend into the south half of zone 607, which may have created Haines 6-type conditions in that area as well.

2. AUGUST 14-16, 2008 HAINES 6/DRY AND UNSTABLE AIR MASS

This was a more widespread Haines 6-type pattern compared to the July event. Figure 10, next page, shows the 500 mb pattern at 1100 PDT on August 13th. Note the upper level ridge axis west of the Cascades. By 1100 PDT on the 14th the upper ridge had strengthened and was centered over the Cascades (see Figure 11 page 41). In addition, at 1100 PDT a strong surface thermal trough extended from Northwest California to the west slopes of the Oregon Cascades and into Northwest Washington.

The pattern persisted on the 15th. Figure 12 on page 42 shows the surface pattern at 1100 PDT. The surface thermal trough was solidly entrenched over the Westside interior valleys. The 1700 PDT Salem upper air sounding on the 14th showed a mid-level Haines 6 and a high-level Haines 5. The subsequent sounding at 0500 on the 15th showed a mid and high-level Haines of 6. The Gnarl Ridge Fire exhibited extreme fire behavior on the 15th.

By 0500 PDT on the 16th the upper level ridge was centered over Central Oregon. However, the surface thermal trough was still west of the Cascades, although an extension of it was in the Columbia River Gorge and into the Columbia Basin of

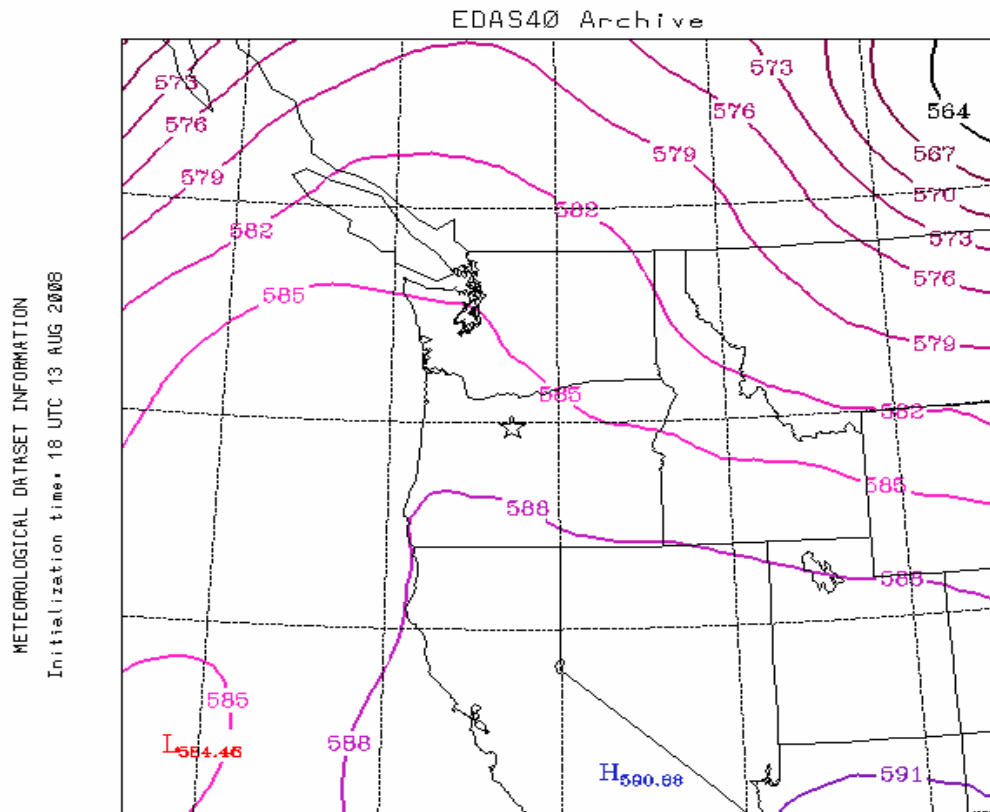
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Southeast Washington. At 1700 PDT the thermal trough had drifted to the west slopes of the Cascades. A southwest onshore surge the morning of the 17th pushed the south part of the thermal trough east of the Cascades. However, the northern west-to-east oriented portion remained over the North Coast Range and North Willamette Valley and through the Gorge. It wasn't until late-afternoon of the 17th that the north portion of the thermal trough was finally forced east of the Cascades.



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FIGURE 10 – 500 MB CHART VALID 1100 PDT AUGUST 13, 2008

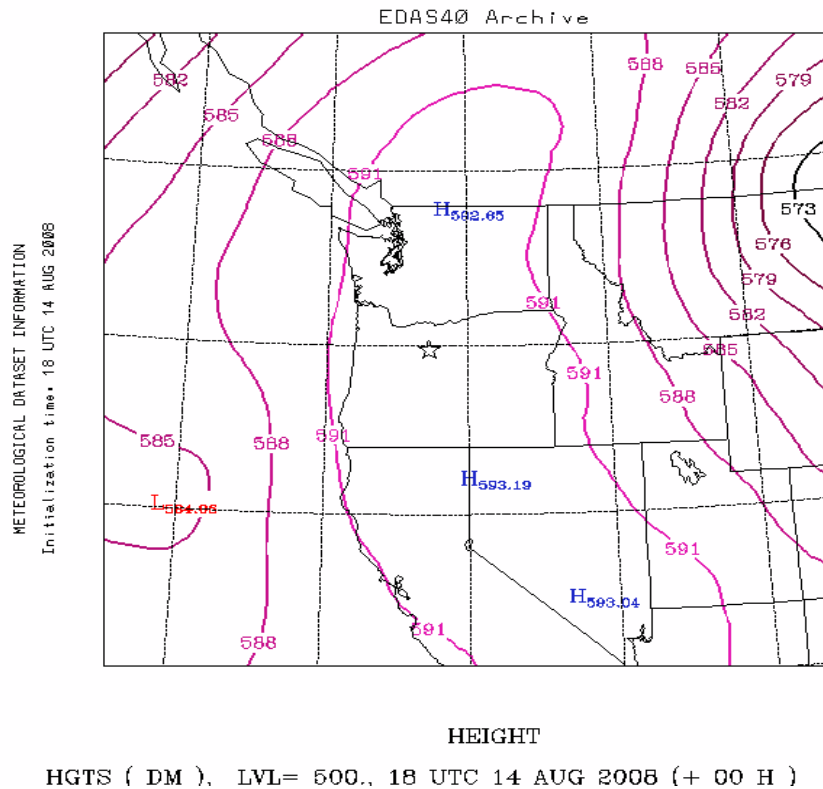
WARNING CHRONOLOGY: A Red Flag warning was issued at 1330 PDT on August 13th. The warning covered all zones except the coastal strip, zones 601 and 612, and was valid from 0500 PDT on the 14th through 0900 PDT on the 16th. At 0859 PDT on the 14th the warning was extended to 1200 PDT on the 16th. Another extension was issued at 0701 PDT on the 15th, which made the warning valid until 1900 on the 16th.

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FIGURE 11 – 500 MB CHART VALID 1100 PDT AUGUST 14, 2008

VERIFICATION: An obvious verification event occurred with the Gnarl Ridge Fire. As mentioned earlier, the Gnarl Ridge Fire showed extreme fire behavior on August 15th, which led to substantial fire growth.

The warning for zone 603 did not verify. No station reported a daytime humidity of 25 percent or less during the event. In zone 604, the Willamette Valley and Clark County lowlands of Southwest Washington, the Troutdale airport observed 22 percent humidity and east wind to near 15 mph at 1453 PDT on the 14th. Willow Creek RAWS registered 24 percent humidity and north wind of 16 mph at 1639 PDT on the 14th, and had 25 percent humidity during the late-afternoon of the 15th.

Several locations in zones 605, 607, and 660 observed daytime humidity of 25 percent or less and nighttime humidity of 35 percent or less during the period. Horse Creek RAWS had humidity of less than 25 percent the morning of the 16th. RAWS stations in zones 606 and 608 also recorded daytime humidity of 25 percent or less on the 14th and 15th.

The daily average ERC value for zones 606 and 608 hit 55.0 on the 16th, which exceeds the 97th percentile value. The average ERC for zones 605, 607, and 660 was 45.6. The highest single-station ERC value of the season for zones 605, 607, and 660 occurred during this event. Dry Creek RAWS registered and ERC of 59.

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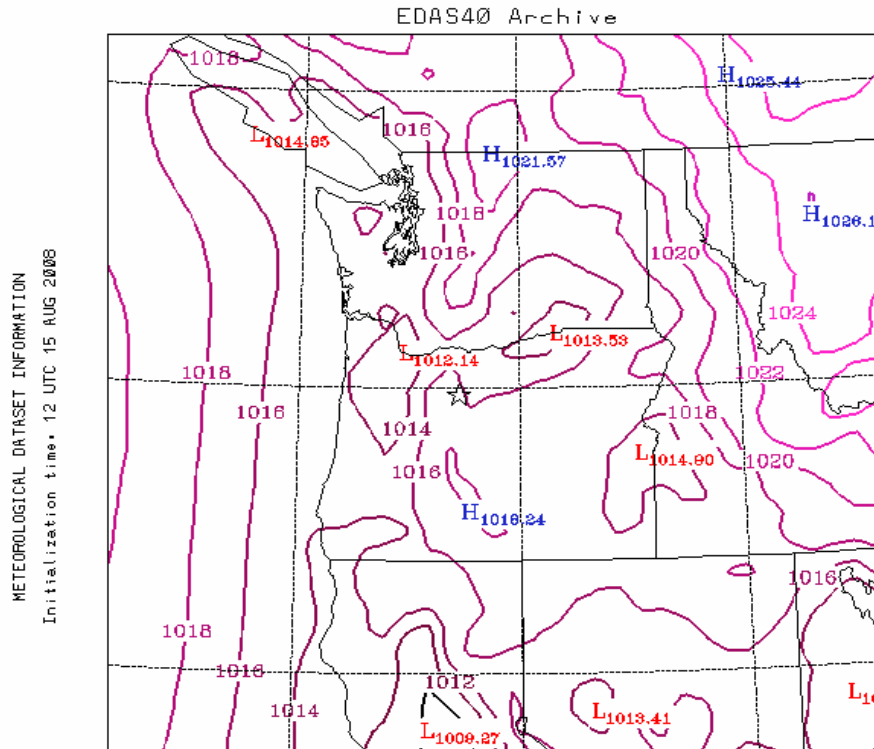


FIGURE 12 – SURFACE CHART VALID 0500 PDT AUGUST 15, 2008

This was a highly-advertised event. Warning lead times ranged from almost 22 hours for zone 606, to slightly over 33 hours in zone 605.

The upper level pattern started to break down late on August 15th. By 2200 PDT on the 16th the upper ridge had shifted east of the Cascades. A moist and unstable south flow over the forecast area resulted in a lightning outbreak, the brunt of which affected the Coast Range. A Red Flag warning was not issued for this. The Northwest Coordination Center Fire Potential Outlook valid for the 16th showed critical fuel conditions over the area. There were several fire starts during the night of the 16th and early on the 17th. In fact, two large fires resulted from this lightning episode. Another fire, the 536-acre Clackamas Complex required a Type III organization. The Middle Fork Complex, a conglomerate of many small fires on the Middle Fork Ranger District of the Willamette NF required a Type II Management Team. Fortunately, the complex was contained at just 218 acres. The Rattle Fire, in the Umpqua NF, eventually consumed 20,000 acres.

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3. AUGUST 17, 2008 LIGHTNING EVENT

This was the only warned lightning event of the season. A lightning pattern developed on the 16th (see previous event) and continued on the 17th. At 0500 PDT on the 17th the upper level ridge was centered over extreme Eastern Oregon and Western Idaho. Deep, south flow aloft continued over the forecast area. The morning run of the higher-resolution North American Model valid in the late-morning and afternoon of the 17th showed the most convective potential along the Cascades. Figure 13 shows the 500 mb upper air pattern and Convective Available Potential Energy, or CAPE. Note the maximum values of CAPE along the Cascades, with the highest values in the Washington Cascades. Figure 14 (next page) is a depiction of the 500 mb pattern and 700 mb streamline flow. The southeast to south streamline flow (black solid arrows) over the forecast area is a favorable orientation for thunderstorm development.



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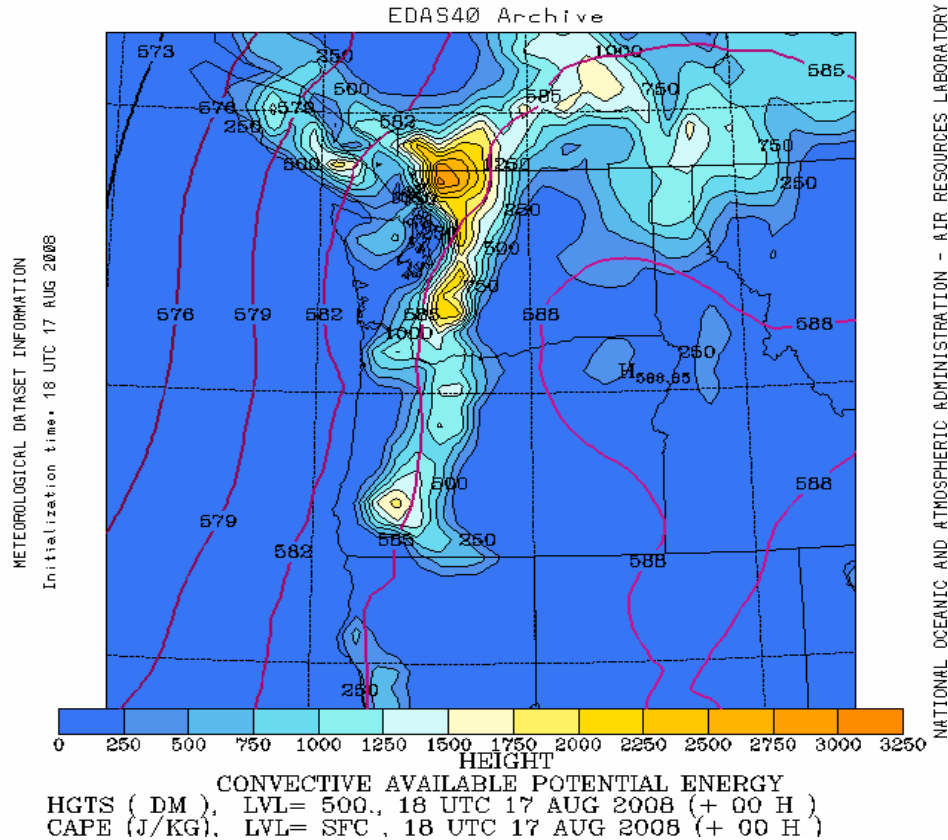


FIGURE 13 – 500 MB PATTERN AND CONVECTIVE AVAILABLE POTENTIAL ENERGY VALID 1100 PDT AUGUST 17, 2008

A Red Flag warning was issued at 0805 PDT on August 17th. The warning was valid through midnight, and covered all zones except the coastal strip. All warned zones verified. The first lightning strikes occurred in zone 602 around 1000 PDT. Lightning activity impacted the Willamette NF during the late morning, and spread to the Gifford

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Pinchot NF by the evening. Lead times ranged from just under two hours in the North Coast Range to almost 11 hours in the Gifford Pinchot NF.



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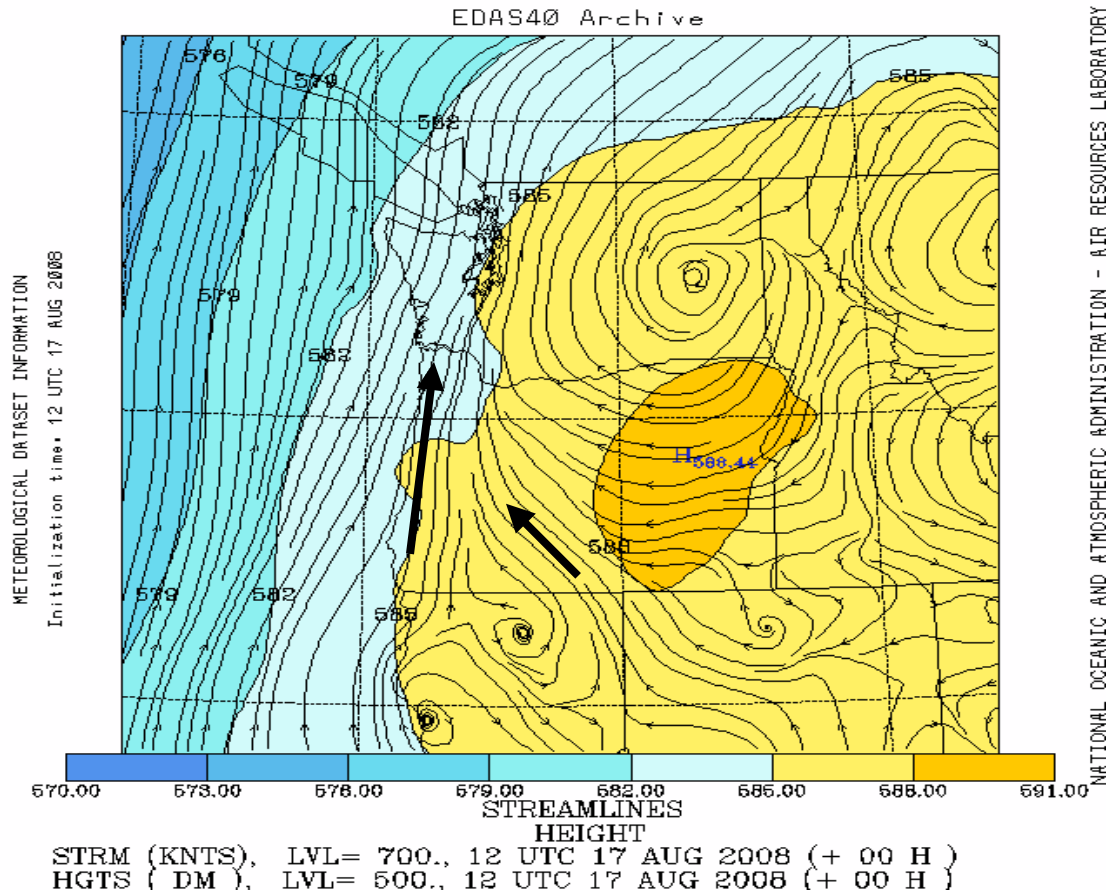


FIGURE 14 – 500 MB PATTERN AND 700 MB STREAMLINES VALID 0500 PDT AUG. 17, 2008

4. SEPTEMBER 11, 2008 HAINES 6/DRY AND UNSTABLE AIR MASS

The first three weeks of September were warm and extremely dry. ERC values dropped from at or above the 95th percentile on August 20th to well below seasonal normals by the end of the month. During the period September 11th through 20th all inland areas experienced several days with median humidity of 25 percent or less, and many nights with median humidity of less than 60 percent. The highest ERC values of the season occurred during the middle of September.

On September 10th high pressure aloft was building into the Pacific Northwest from the west. A much cooler air mass resided over the Northern Rockies. A surface thermal trough was situated over Northern California and extended into the Willamette Valley. By 0500 PDT on the 11th the surface thermal trough had become firmly established along the south and central Oregon Coast and into the North Oregon Coast Range (see figure 15). The red dotted lines indicate the surface thermal trough axis. A surface thermal low

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along the coast is indicative of offshore low-level flow. Although the offshore gradient was not overly strong, the combination of extremely dry fuels, wind and low humidity prompted the issuance of a Red Flag warning for the Willamette and Clark County lowlands of Southwest Washington. Hence, this event was comprised of two Red Flag situations: 1) Haines 6-type conditions for the Cascade and Coast Range zones and 2) wind and low humidity for the zone 604.

By 1400 PDT on September 11th the surface thermal trough had migrated to the Willamette Valley and Clark County lowlands and the Cascade foothills. The trough axis continued to drift east during the late afternoon and evening. At 2200 PDT the thermal trough was over the Cascade zones.



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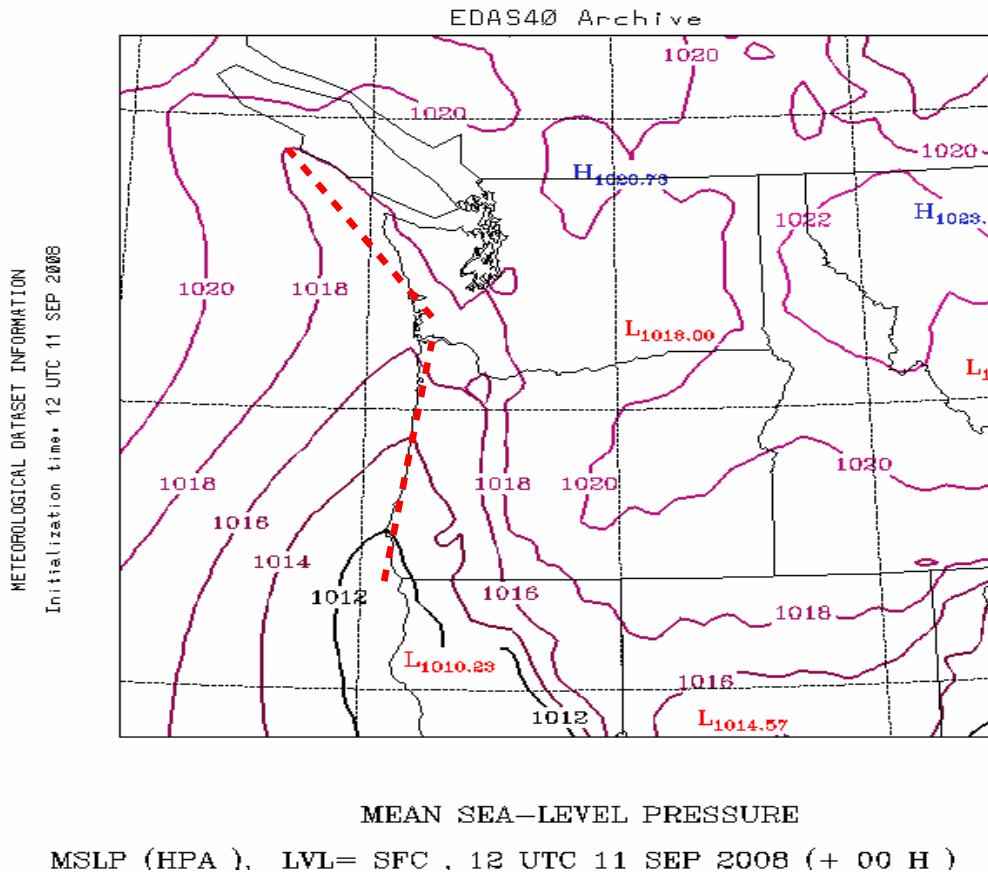


FIGURE 15 – SURFACE PATTERN VALID 0500 PDT SEPTEMBER 11, 2008

WATCH/WARNING CHRONOLOGY: A Fire Weather Watch was issued at 1458 PDT on the 9th, valid from 0200 PDT to 2100 PDT of the 11th. The Watch covered all zones except the coastal strip zones, and zone 660. At 1152 PDT on the 10th the watch for zone 603 was dropped, and a Red Flag Warning for wind and low humidity was issued for zone 604, which was valid from 0800 to 2000 of the 11th. In addition, a Red Flag

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Warning for Haines 6-type conditions was issued for zones 605, 606, 607, and 608 valid from 0800 PDT through 2000 PDT of the 11th.

VERIFICATION: The 1700 PDT Salem and Medford upper air soundings from the 11th indicated a high-level Haines 5. The Salem observation yielded a mid-level Haines 6. The warning for Haines 6 conditions verified in all warned zones. Horse Creek RAWS, zone 605, reached wind and humidity criteria from 2339 PDT on September 10th through 1539 PDT on the 11th. Log Creek RAWS, in zone 607, recorded humidity of 25 percent or less during the early-morning hours of the 11th. Zones 606 and 608 experienced poor overnight recovery, and widespread daytime humidity values less than 25 percent.

The surface thermal trough was situated over the coastal valleys at 0800 PDT on the 11th. By 1400 PDT it had moved to the Willamette Valley, and by 2200 PDT had shifted to the Cascades.

The warning for wind and low humidity in zone 604 also verified. Troutdale airport reached criteria from 1153 PDT through 1653 PDT. The Aurora airport station observed criteria from 1353 PDT through 1753 PDT. However, the station suffered an outage from 1253 PDT through 1753 PDT. It returned to service shortly after 1753 PDT. The first available wind report indicated North to Northeast wind of 14 mph. Several other surrounding anemometer readings confirmed the Red Flag conditions (wind speed of 15 mph or more).

Watch lead times ranged from nearly 33 hours to 45 hours. There was zero warning lead time for the Haines 6 conditions. Nearly all zones had reached criteria by the early morning hours of the 11th. The warning was not issued until shortly before noon of the 11th. There was a 24-hour lead time for the Willamette Valley and Clark County lowlands.

5. SEPTEMBER 15-16, 2008 HAINES 6/DRY AND UNSTABLE AIR MASS

This was another Haines 6-type pattern that resulted in the renewed life of the Gnarl Ridge Fire. At 0500 PDT on September 14th an upper level ridge was centered well off the Oregon and Washington coast. A surface thermal trough was situated along the coast. By 1700 PDT of the 14th the upper level ridge had moved directly over Oregon and Western Washington (see figure 16 on the next page). At the same time, the surface thermal trough was centered over the Rogue Valley and extended north through the Oregon Coast Range and into Western Washington. Figure 17 on page 47 is a hand-drawn surface analysis showing the location of the thermal trough, red dashed lines, and existing fires. The thermal trough remained nearly stationary through the early morning hours of the 16th, and finally shifted to the Cascades by 1700 PDT. The trough eventually moved east of the Cascades by 1100 PDT of the 17th.

This Haines 6 episode created control problems on the Lonesome and Rattle Fires, in Medford's forecast area. The Gnarl Fire, in the Mt. Hood NF, showed considerable growth on September 16th. Nighttime subsidence inversions resulted in extended burn periods.

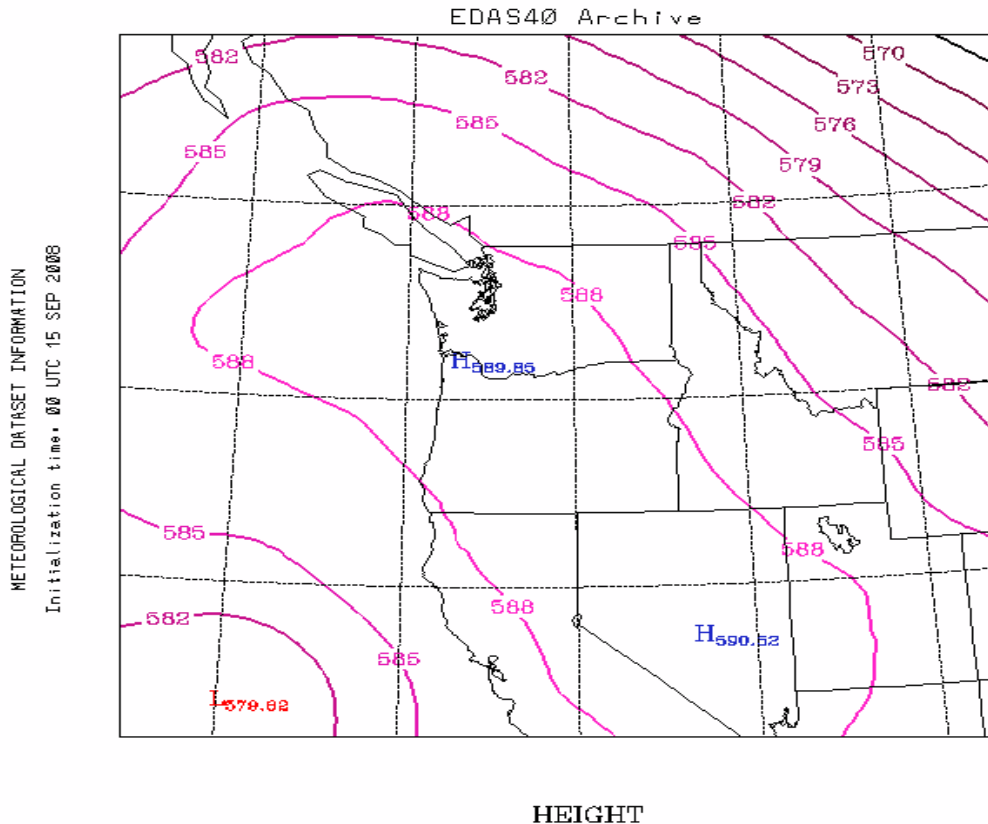
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In some instances, fire activity on existing large fires was more pronounced at night than during the day.



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION - AIR RESOURCES LABORATORY

FIGURE 16 – 500 MB CHART VALID 1700 PDT SEPTEMBER 15, 2008

WATCH/WARNING CHRONOLOGY: A Fire Weather Watch was issued at 1529 PDT on September 13th. The watch covered zones 605, 606, 607, and 608 and was valid from the morning of the 15th through the evening of the 16th. The Watch was upgraded to a Warning at 1430 PDT of the 14th. The warning was valid from 0600 PDT of the 15th through 2300 of the 16th, and included zone 660.

VERIFICATION: The 0500 PDT Salem and Medford upper air soundings indicated mid-level Haines 6 values, and high-level Haines 5. The 1700 PDT observations yielded the same result, except the high-level Haines at Medford was a 6. Mid and high-level Haines 6 values were observed off the 0500 PDT soundings.

Several RAWS sites in the Cascade zones observed nighttime humidity of 30 percent or less during the morning hours of the 15th and 16th. For example, Pebble RAWS, in zone 608, registered humidity of 25 percent or less at 1053 PDT on the 15th and 1053 PDT on the 16th. A prominent subsidence inversion the night of the 15th resulted in very poor

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humidity recovery in the Cascades and foothills. Emigrant RAWS, at the south end of zone 608, observed a maximum humidity recovery of 18 percent on the 16th and a minimum daytime humidity of 7 percent. Yellowstone RAWS, in zone 606, had a humidity recovery of 23 percent. Several sites in the North Oregon and South Washington Cascades and foothills observed maximum humidity values around 25 percent.

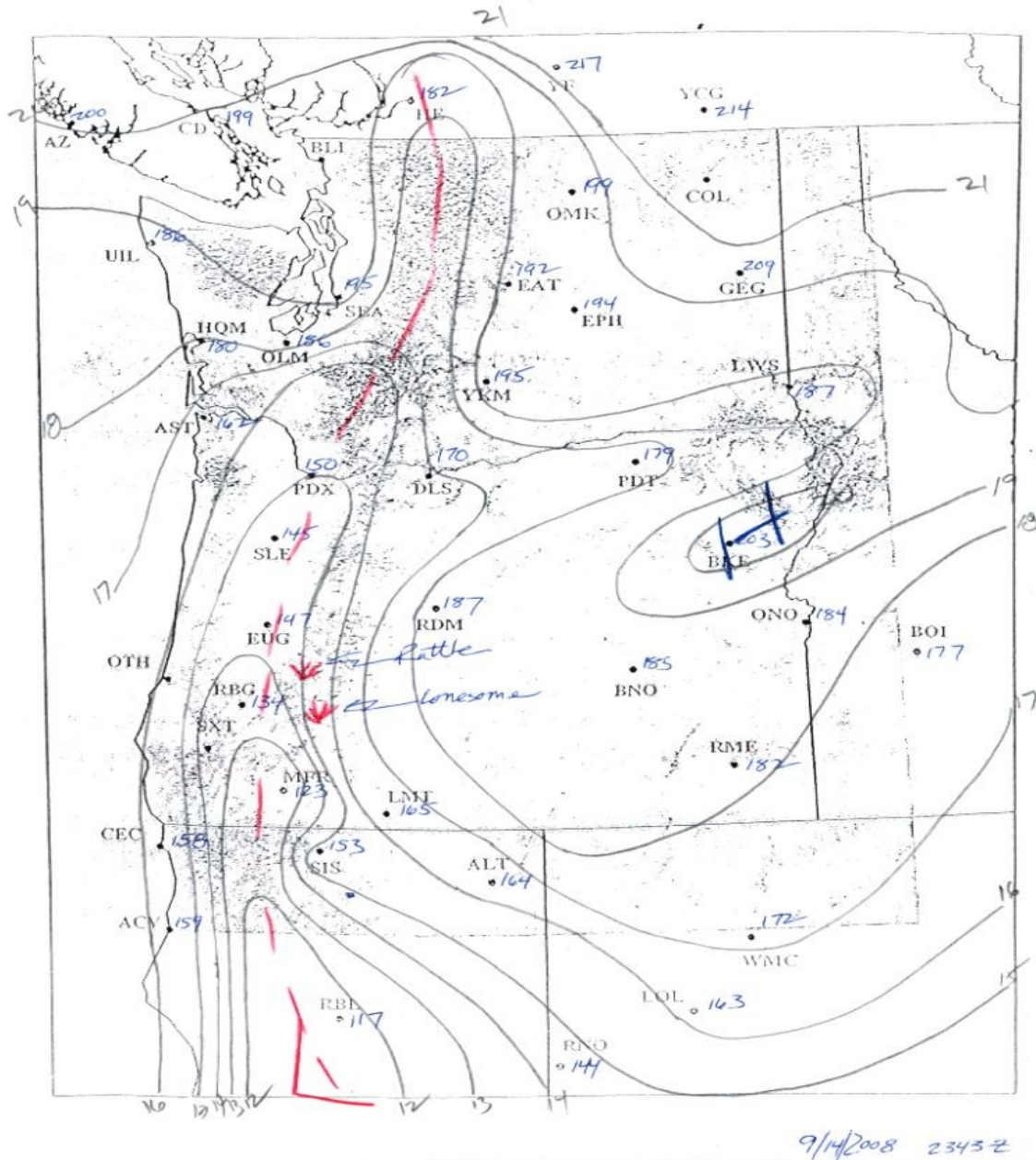


FIGURE 17 – SURFACE ANALYSIS 1643 PDT SEPTEMBER 14, 2008. COURTESY OF TERRY MARSHA, NWCC METEOROLOGIST

Fuel indices had reached extreme levels by the onset of this event. The daily average daily ERC for zones 606 and 608 reached 56.9 on September 16th. This was the highest daily average of the season. The average daily ERC for the 17th was 55.6. The 100-hour

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fuel moisture values dropped to as low as 3 percent in zones 606 and 608 during this event.

The average Watch lead time ranged from a little over 58 hours for zone 605, to almost 62 hours in zone 607. The warning lead times were generally 35 to 40 hours. Determining lead times for Haines 6 events is difficult. The above lead times are based on the time that humidity of 25 percent or less is realized, closest to the 1700 PDT upper air observations. Model and satellite-derived soundings were used to confirm the presence of subsidence inversions during the night of the 15th and early morning hours of the 16th. Haines 6 conditions really did not verify on the 15th since the Medford and Salem soundings showed a high-level Haines 5. However, other things taken into consideration included location of the surface thermal trough in relation to any existing fires, fire progression maps, and pertinent information via the ICS-209 fire reports.

6. SEPTEMBER 29, 2008 HAINES 6/DRY AND UNSTABLE AIR MASS

This was the final Red Flag event of the 2008 season. At 0500 PDT on September 28th, a strong upper level ridge was centered over Northern Nevada and Southern Oregon. A sharp thermal trough was situated along the coast. By 1700 PDT, the thermal trough was located over the Coast Range, resulting in moderate offshore low-level flow. The offshore gradient reached maximum intensity during the late morning and early afternoon hours of the 29th. The core of the thermal trough was located over the South and Central Oregon Cascades. By 2200 PDT, the thermal trough had shifted to the Cascades and the east slopes.

WATCH/WARNING CHRONOLOGY: A Fire Weather Watch was issued at 1505 PDT on September 27th for Haines 6-type Conditions in zone 608. The Watch was valid from the morning of the 29th through the evening. The Watch was continued at 0920 PDT on the 28th, and then upgraded to a warning at 1346 PDT. The Warning was valid from 0300 PDT on the 29th through 2300 PDT.

VERIFICATION: The 0500 PDT Salem and Medford soundings on the 29th indicated high-level Haines 5 and mid-level Haines 6, as did the 1700 PDT observations. Fields RAWS reported humidity of 25 percent or less at 0214 PDT on the 29th through 1914 PDT. The Kitson Springs Fire, in the Willamette NF, showed extreme fire behavior during the early-morning hours of the 29th. The Warning should have included zone 606. Yellowstone RAWS observed nighttime humidity of 30 percent or less. In addition, the offshore gradient created strong northeast to east wind in portions of the Willamette Valley and near the west end of the Columbia Gorge. The Portland and Troutdale airport stations reached wind and low humidity criteria on the 29th. The Hillsboro and Vancouver stations came very close.

The watch lead time was a little over 35 hours, and the warning lead time was 12 hours and 28 minutes. ERC values at Emigrant and Fields RAWS on the 29th were 67 and 61, respectively, well above the 95th percentile.

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ADDITIONAL COMMENTARY ON CRITICAL FIRE WEATHER PATTERNS

Fires burning under a dry and extremely unstable air mass tend to be plume-dominated and can exhibit extreme fire behavior. The Haines Index is a tool used to assess the degree of air mass instability and dryness. In addition, at least **ONE RAWS** must report a minimum humidity of 25 percent or less.

A dry and unstable air mass event is difficult to validate. Upper air soundings in Oregon are taken at Salem and Medford. Obviously, upper air data coverage is rather sparse. The Portland Fire Weather Office uses a model grid to produce forecast guidance. The Haines Index is one product of the guidance. Afternoon **FORECAST** Haines Index values are available, but may not be what the true value is for the day.

Problem lightning is virtually impossible to evaluate and predict. The general definition of problem lightning is lightning with no significant accompanying precipitation that would result in an appreciable change in fuel conditions. Objective criteria to evaluate this phenomenon are difficult to develop due to the localized nature of thunderstorms and the relative scarcity of RAWS stations. The Northwest Coordination Center devised a different approach for problem lightning. Instead of concentrating on whether or not precipitation accompanied thunderstorms, the emphasis was placed on fuel conditions. The NWCC developed a Dryness Level product that takes into account ERC and 100-hour fuel moistures. The Portland Fire Weather Office adopted this methodology for problematic lightning episodes. The main determining factor for warning issuance and validation was whether or not the fuel conditions showed a significant change during and after a thunderstorm event.

National Weather Service

Fire Weather Program



FORECASTS AND SERVICES

SPOT FORECASTS

There were about 40 percent more spot forecast requests this year compared to 2007. The total of 134 spot forecasts easily exceeded the 95 spots of 2007, but did not come close to the 216 spots of 2006. In 2008, there were more wildfire spot forecasts compared to prescribed burn requests. There were 73 wildfire spot forecasts, nearly triple the number from 2007. The most active months for prescribed burn requests were September and June, with 21 and 11 spots, respectively. The majority of the wildfire spot requests occurred in August and July, with 34 and 23 forecasts, respectively. Despite a dry late-September and much of October, prescribed spot requests were not as numerous as expected. Critical fire weather conditions occurred through much of September, which curtailed most of the prescribed burn activities. Figures 18 and 20, on pages 53 and 55, show the 2008 spot breakdown by month and the annual spot summary since 1992.

The Willamette National Forest continued to be the primary user. The Willamette NF accounted for 37 percent of the total spot requests. The Willamette NF had 29 wildfire spot requests in 2008, compared to just two in 2007. The majority of the wildfire spot requests for the Willamette NF were attributed to the Middle Fork Complex and the Kitson Springs fire. The Forest Service accounted for 84 of the 134 total spot requests. It is interesting to note that the Oregon Department of Forestry (ODF) continued to be more involved in the spot forecast program. The ODF had 24 spot requests. Even the Fish and Wildlife Service submitted some spot requests. As is customary, the Salem BLM office conducted an early-spring spray project that resulted in four spot requests.

The most active spot months were August, September, and July. The spring burn period was quiet, with just five spot requests in May and 11 for June. The primary cause for the lack of spring spots was the heavy mountain snow pack. There were a handful of requests for training purposes, such as fire schools, and one other request for a search-and-rescue mission in the Mt. Hood National Forest.

INTERESTING SPOT FORECAST TIDBITS FOR 2008

- ☛ The **FIRST** spot request for 2008 occurred May 16. The Willamette National Forest made a request for the prescribed burn project “Flatco 3”. The **LAST** spot request for the season was October 30, submitted by Salem BLM for a prescribed burn project.
- ☛ The **FIRST** wildfire spot was issued June 30, 2008 for a fire in the Oregon Dunes National Recreation Area of the Siuslaw National Forest. The

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LAST wildfire spot forecast was issued October 27, 2008 for the Larch Mountain Fire, on ODF land.

☛ The most spot forecasts in one day: 6 on July 14th. There were 5 spots on August 10th.

☛ There were 84 spot requests from the Forest Service (USFS), or 63 percent of the seasonal total. The BLM made 12 requests, similar to last year. Six of the requests were for prescribed burns, five for spray projects, and one for a wildfire. Oregon Department of Forestry (ODF) submitted 24 requests, 13 for prescribed burns and 11 for wildfires. Nine spot requests came from the US Fish and Wildlife Service, and three came from the City of Portland.

☛ The 84 USFS spot requests were divided amongst the forests as follows: 50 for the Willamette, 20 for the Gifford Pinchot, 13 for the Mt. Hood, and 1 for the Siuslaw.

☛ The Eugene BLM district had seven spots, while the Salem district accounted for five requests.

☛ August was much busier this year compared to last year. There were 39 spot requests this August, compared to 9 last year. September 2008 had 32 spot requests, double the 16 in September 2007. There were four large fires (100 acres or at least Type II management level) in the Portland forecast area. Two fires, Gnarl Ridge and Cold Springs, were on the boundary with Pendleton. In fact, the Gnarl Fire was in Pendleton's public and fire weather forecast domain, but the Portland office retains spot forecast responsibility for the east-side districts of the Mt. Hood National Forest.

TURN-AROUND TIME

“Turn-Around Time” has been documented since the 2000 season. It is defined as the elapsed time between spot request receipt, or notification, and forecast transmission. The Web-based spot program makes this element very easy to monitor. However, some complications continue for prescribed burns. Quite often, the user-agency will submit a spot request the day before actual ignition. Obviously, turn-around time is not applicable in these cases. The precedent for the Portland office is to disregard turn-around time for requests submitted in advance of the actual burn time.

A past agreement between the former Pacific Northwest Wildfire Coordinating Group (PNWCG) and Western Region of the National Weather Service (NWS) stated that required turn-around times were to be at least 45 minutes for wildfire spot requests and 60 minutes for prescribed burns, unless prior arrangements have been made. In 2008 the

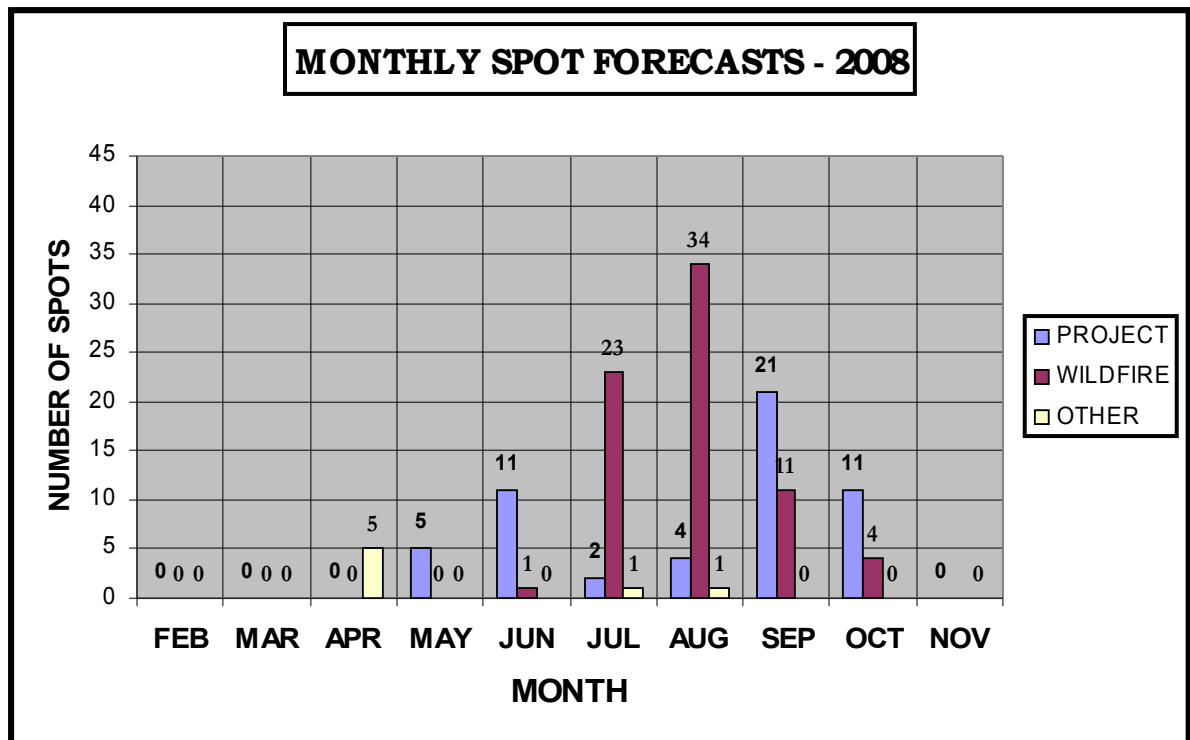
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Portland office achieved a turn-around time of 29.11 minutes for prescribed burns, and other miscellaneous requests, when turn-around time was applicable, and 35.63 minutes for wildfires. The average non-wildfire spot forecast turn-around time for 2008 was nearly 8.5 minutes shorter than the average for 2007. The 2008 wildfire spot forecast turn-around time was about four minutes shorter than last year. There are times the Portland office may not have a qualified spot forecaster on duty. When this occurs, a certified spot forecaster must be called back to the office. At the end of the 2008 season the Portland office had 10 qualified spot forecasters and three others in training status. The likelihood of having to call in someone to handle a spot request is much lower than previous years.

The web-based spot program provides a quick and easy means for users to request spot forecasts. There were a few occasions when the completed spot forecast suffered delays upon transmission. These instances seemed to become less of a problem during the latter stages of the fire season.

There was one instance when the applicable turn-around time exceeded 100 minutes. A wildfire spot request for the Gnarl Ridge Fire on August 23rd took 146 minutes to complete. The spot request came into the office at 1739 PDT, well after normal fire-weather hours. Fortunately, there was a spot-qualified person working the evening public forecast shift to complete the spot forecast. The Annual Operating Plan (AOP) states that prescribed burn requests **SHOULD** be in by 1200 on any given day. Typical spot turn-around times were on the order of 15 to 30 minutes.

FIGURE 18 – 2008 SPOT FORECASTS (BY MONTH)



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Table 8 shows the annual spot forecast data from 1994 to 2008. The spot frequency showed a dramatic increase from 2000 to 2003, but due to the change in forecast area responsibility and agency requirements for prescribed burns, 2004 spot totals were much lower. Also, some units/districts curtailed prescribed burn activities in 2004 due to budget constraints, staffing concerns, or a number of other reasons.

TABLE 8 – ANNUAL SPOT FORECAST DATA

YEAR	PROJECT*	WILDFIRE	TOTAL
1994	44	21	65
1995	104	15	119
1996	64	51	115
1997	58	9	67
1998	52	31	83
1999	58	54	112
2000	89	20	109
2001	125	70	195
2002	123	147	270
2003	117	132	249
2004	71	21	92
2005	55	29	84
2006	120	96	216
2007	70	25	95
2008	61	73	134

** = INCLUDES TRAINING SPOTS, SEARCH AND RESCUE, AND OTHER MISC. REQUESTS.*

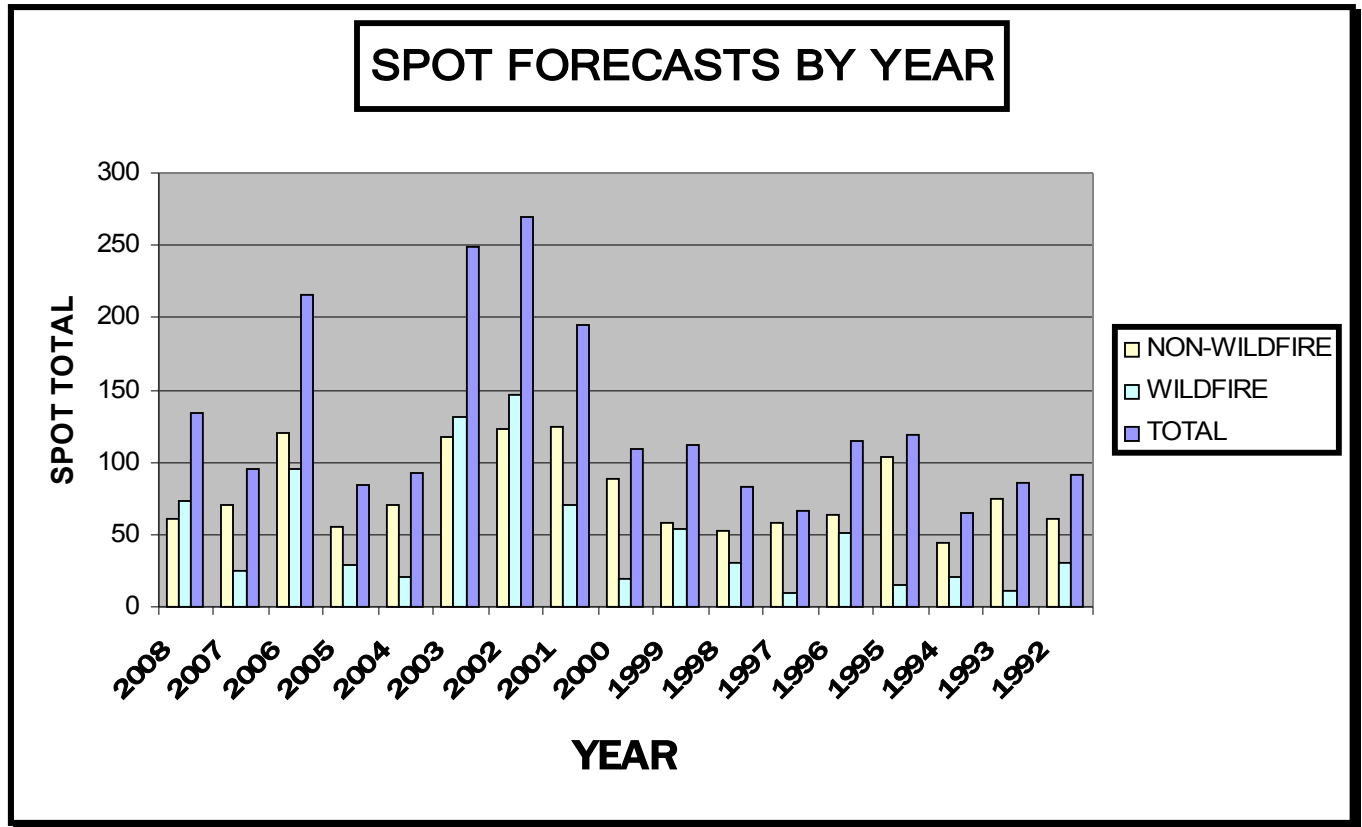


FIGURE 19 – GOLD HILL LOOKOUT IN THE WILLAMETTE NF

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Figure 20 below shows the yearly spot breakdown from 1992 to 2008

FIGURE 20 – ANNUAL SPOT FORECAST TOTALS



FORECAST SERVICES

The fire weather desk was staffed from March 17, 2008 through October 31, 2008. Full-time fire weather operations (7 days a week) commenced on May 25, 2008, nearly the same time as last year, and ended on October 18, 2008. Internet weather briefings started on June 2, 2008. Participation has steadily increased during the past few years. There were generally 6-10 users on during peak fire season, and up to around 15 during critical event periods. Eugene Dispatch, Mt. Hood N.F., Gifford Pinchot N.F., several ODF units, and the north and south zones of Willamette N.F. were the primary participants. Daily internet briefings ended on October 3, which was about one week earlier than last year. The Portland office participated in daily coordination calls set up by the Northwest Coordination Center. These calls started on June 26 and ended October 2nd. The Portland office also supplied one person to the Coordination Center from March through the end of October. The office continued to have two IMETs.

NFDRS forecasts started on May 5th and ended on October 19th. Specific point forecasts continued for Village Creek, Pebble, and Fields, South Fork, Horse Creek, Wanderer's

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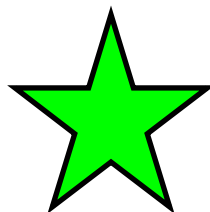
Peak, Yellowstone and Canyon Creek RAWS. Verification statistics are based on persistence forecasts.

The baseline statistic is forecaster improvement over persistence. The old Memorandum of Understanding (MOU), which expired in 2005, included verification performance standards. These standards included 35 percent improvement for temperature, 25 percent improvement for humidity, and 10 percent improvement for wind. The current expectations are less rigid than the expired MOU. The Portland office experienced a five percent increase in temperature, 33 percent improvement over persistence this year compared to 28 percent in 2007. The 2008 humidity score was nearly six percent better, 28 percent this year to 22 percent in 2007. The Portland office achieved its first positive wind score since at least 2000.

The point forecast statistics showed even higher improvement over last year. The temperature scores ranged from 35 percent to 45 percent. Last year, the range was 25 to 35 percent, except for South Fork at nearly 40 percent. Humidity scores ranged from 33 to 43 percent, compared to 23 to 33 percent in 2007. The biggest improvement was in the wind forecasts. The average score for the eight RAWS points was around 15 percent. Last year, the average wind score was close to 5 percent. In 2009, the Portland office will provide point forecast trends for nearly all of the RAWS sites. It has been shown that higher performance scores are achieved when doing point forecasts, instead of zone trend forecasts.

TRAINING AND EDUCATIONAL OUTREACH ACTIVITIES

Portland continued to be heavily involved in teaching and training activities. Table 9 shows all of the outreach activities from fall 2007 through summer of 2008. The Portland office has several people involved. The S-190 through S-590 series has undergone major revisions. PowerPoint presentations have been developed, replacing the slides and overhead projection graphics. Portland continues to have some responsibility for teaching and training services for zones 609, 610, and 611 although Pendleton is the primary resource.



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TABLE 9 – TRAINING AND EDUCATIONAL OUTREACH ACTIVITIES

DATES	ACTIVITY	AGENCY/USER	INSTRUCTOR
December 11-12, 2007	S-290 REDMOND	COCC	RUTHFORD
January 14-15, 2008	S-390 REDMOND	COCC	RUTHFORD
February 28-29, 2008	S-290 KELSO	COWLITZ COUNTY	RUTHFORD
March 9-21, 2008	S-590 TUSCON		TOOK COURSE
March 18-20, 2008	IMET WORKSHOP BOISE	NWS	WEISHAAR (ATTENDED)
April 8, 2008	IC MEETING PORTLAND	MULTI-AGENCY	RUTHFORD
April 9, 2008	BLUE SKY SEMINAR SEATTLE		RUTHFORD (ATTENDED)
April 14, 2008	PQR FIRE WEATHER MEETING	NWS	RUTHFORD/WEISHAAR
April 22-23, 2008	S-290 TILLAMOOK	ODF	WEISHAAR
April 21-24, 2008	SEASONAL ASSESSMENT WORKSHOP	PREDICTIVE SERVICES	RUTHFORD
April 26-27, 2008	S-290 WALDPOR	ODF	RUTHFORD
April 29-May2, 2008	NFDRS/WIMS	VARIOUS	RUTHFORD
May 7, 2008	OREGON IMT TYPE II MEETING HOOD RIVER	MULTI-AGENCY	RUTHFORD
May 12, 2008	S-190 TIMBERLAKE JOB CORP. RIPPLEBROOK	USFS	WEISHAAR
May 17, 2008	S-190 BRUSH PRAIRIE	USFS/DNR	WEISHAAR
May 19-21, 2008	BLUE SKY/AIR FIRE BOISE	VARIOUS	RUTHFORD

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DATES	ACTIVITY	AGENCY/USER	INSTRUCTOR
May 22, 2008	FIRE REFRESHER ESTACADA	USFS	RUTHFORD (ATTENDED)
May 27, 2008	S-390 WARM SPRINGS	BIA	RUTHFORD
June 4, 2008	FIRE REFRESHER MT. RANIER NP	NPS	RUTHFORD
June 11, 2008	FIRE WX USERS CONFERENCE SEATTLE	VARIOUS	RUTHFORD
June 17, 2008	S-190 CAMP BALDWIN	USFS	COLLINS
September 17, 2008	NWS WATER AND WEATHER MEDIA WORKSHOP EUGENE	VARIOUS	RUTHFORD

LARGE FIRES AND IMET DISPATCHES

The 2008 fire season was more active than 2007. There were four large fires in the Portland Forecast area, shown below in Table 10.

TABLE 10 – MAJOR FIRES

FIRE NAME	AGENCY	SIZE	START DATE	CONTAIN DATE	CAUSE
Cold Springs	USFS Gifford Pinchot	7729	July 12, 2008	August 1, 2008	Lightning
Gnarl Ridge	USFS Mt. Hood	3280	August 8, 2008		Lightning
Middle Fork	USFS Willamette	218	August 17, 2008	August 29, 2008	Lightning
Kitson Springs	USFS Willamette	808	September 24, 2008	October 2, 2008	Human-caused

The Cold Springs and Gnarl Ridge fires straddled the Portland and Pendleton fire weather boundary. The Portland office continued to have two qualified Incident Meteorologists (IMET's) in 2008. One of the IMETs spent considerable amount of time detailed at the Northwest Coordination Center to provide support for decision-making and resource allocation. This continues to be a very important mission to the Coordination Center.

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The Portland office filled **SEVEN** IMET requests. One dispatch, which lasted less than a day, was for continued support on a lengthy prescribed burn project on the Naches district of the Wenatchee/Okanagon National Forest. The project was shut down due to a lengthy wet period at the end of May and first week of June.

1. YAKIMA RIVER Rx PROJECT (1 DAY)

IMET: SCOTT WEISHAAR
DATES: June 2
LOCATION: Naches Ranger District.

BURN BOSS: Jim Bailey

2. IRON/ALPS COMPLEX (17 DAYS)

IMET: JULIA RUTHFORD
DATES: June 22 through July 8
LOCATION: Shasta-Trinity National Forest. Big Bar Ranger District

IMT: Type II – Kent Schwartzlander IC
Iron Complex June 23 through June 29

Type II – Kim Soper IC
Alps Complex June 26 through July 7

Type I – Paul Broyles IC
Iron Complex June 29 through July 7

CAUSE: Lightning

3A. YOLLA BOLLY COMPLEX (8 DAYS)

IMET: SCOTT WEISHAAR
DATES: July 1 through July 8
LOCATION: Mendocino National Forest. Yolla Bolly District
ICP – Corning, CA at Holiday Inn Express

IMT: Type II – Rich Harvey IC
CAUSE: Lightning

3B. BTU COMPLEX (9 DAYS)

IMET: SCOTT WEISHAAR
DATES: July 8 through July 16

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LOCATION: CAL FIRE (state) Butte Unit

ICP: Chico Fairgrounds

IMT: Cal Fire Team 9 Type I – George Morris IC
CAUSE: Lightning

4. COLD SPRINGS FIRE (11 DAYS)

IMET: JULIA RUTHFORD
DATES: July 13 through July 25
LOCATION: Gifford Pinchot National Forest.
Mt. Adams Ranger District

IMT: Central Oregon Type II – Mark Rapp IC
CAUSE: Lightning

5. BLUE-2 FIRE (16 DAYS)

IMET: SCOTT WEISHAAR
DATES: July 30 through August 14
LOCATION: Six River National Forest
Gasquet/Orleans Ranger Districts

ICP: Big Flat (approx. 16 miles south of Gasquet, CA)
IMT: California Team 5 Type I – Mike Dietrich IC
Alaska Type I – Lynn Wilcock IC
CAUSE: Lightning

6. WILD RIVERS COMPLEX (8 DAYS)

IMET: JULIA RUTHFORD
DATES: August 25 through September 2
LOCATION: Siskiyou National Forest
Rogue River District

IMT: Type II – Tom Suwyn IC
CAUSE: Lightning

7. KITSON SPRINGS FIRE (7 DAYS)

IMET: JULIA RUTHFORD
DATES: September 27 through October 3
LOCATION: Willamette National Forest
Middle Fork District

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ICP: Oakridge Designated Fire Camp
IMT: Central Oregon Type II –Mark Rapp IC
CAUSE: Human-caused

FINAL SUMMARY

The 2008 fire season was divided into two segments. The majority of the season took place from late-June through the second week of August. A secondary, shorter segment began in late August and ended at the end of September. Extreme fuel conditions were realized in 2008, generally from the second week of July through mid-August, and again during the first three weeks of September. There were six Red Flag events, which was twice as many for any given year. Lightning activity was less than normal in nearly all areas. The exception was the Coast Range. Lightning frequency was much lower than average in the Cascades. Antecedent conditions, including snow pack and spring precipitation, among other things, resulted in a somewhat later-than-normal start to the peak fire season. High elevations maintained snow pack well into June, which helped to maintain low fuel indices. The abundant snow pack and a wet period from mid-May through early June severely curtailed prescribed burn activity, especially at high elevations. However, it did not take long for the high elevations to reach critical fuel conditions. Most areas achieved 90th percentile or higher ERC values in early July. Despite much lower than average lightning activity, the forecast area had four large fires. There were five Haines 6/unstable air mass events during the 2008 season. Although Haines 6 by itself does not initiate fires, those conditions exacerbated ongoing fires, and resulted in at least one human-caused fire to get big.

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